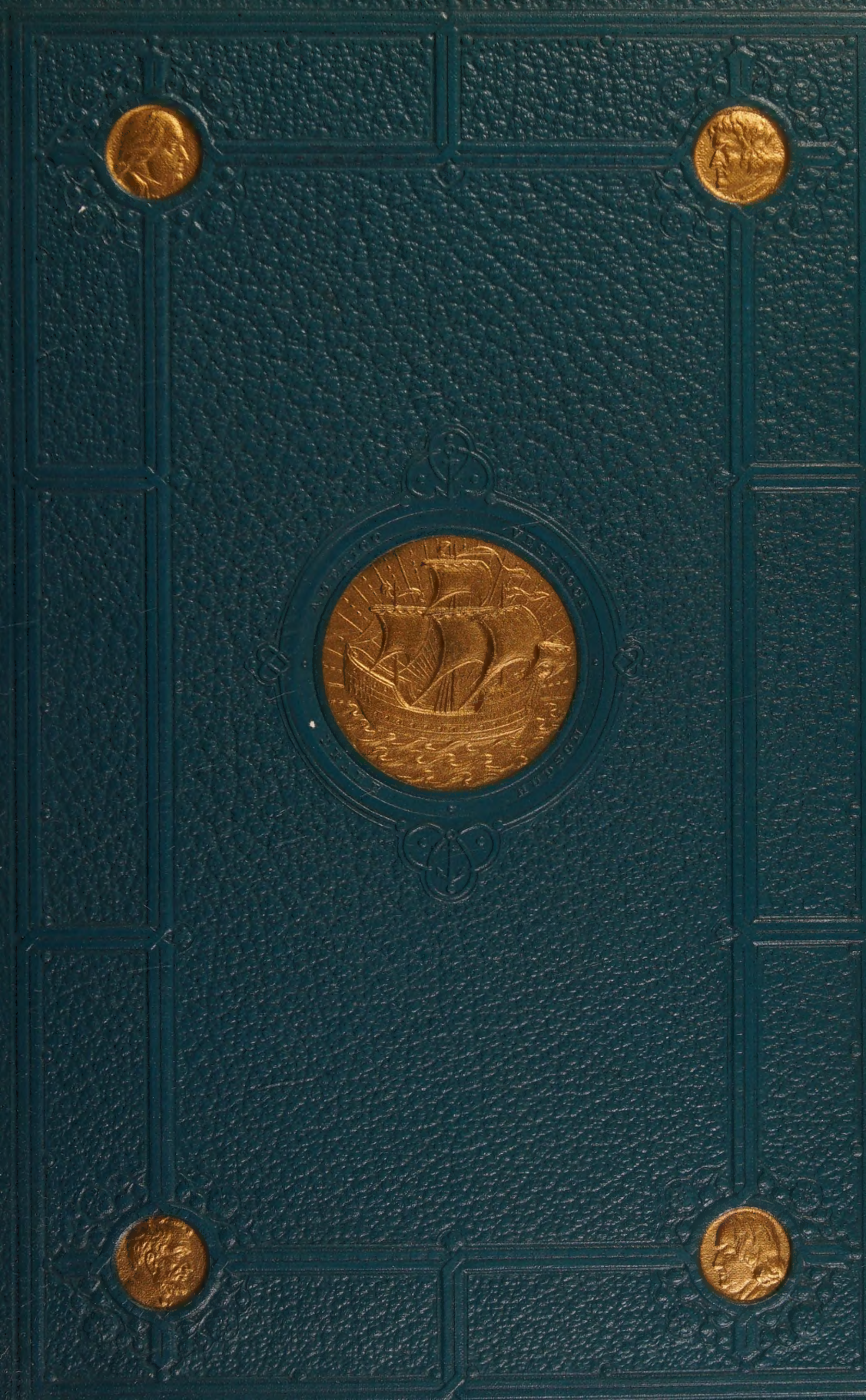

The
BOOK *of* KNOWLEDGE

The Children's Encyclopedia

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DEPARTMENTS

The Earth
Stories and Legends
All Countries
Golden Deeds
Helps to Learning
Literature
Animal Life
Famous Books
Dominion of Canada
The United States
Familiar Things
Our Own Life
The Fine Arts
Men and Women
Poetry and Rhymes
Plant Life
Things to Make
and Things to Do
Book of Wonder

VOLUME X

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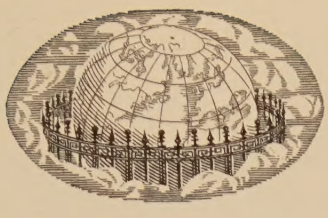

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Photo, E. G. Wooster. Among the Connecticut hills.

THE UNITED STATES OF AMERICA

CONTINUED FROM 3220

OUR country is generally known as America and we are called Americans. It is not uncommon, however, for Americans to be told by Canadians or by people from some of the Latin American countries that they, too, are Americans and that we have no right to think that we of the United States are the only Americans. How would you explain why you, and not they, had the right to be called an American? At times Americans have been at a loss to make an answer to such statements.

It is because the official name of our country is the United States of America, and we were the only independent nation when the name was adopted. It would not sound well to be called "United Statesans," and so we were called Americans. The people of the South American countries are South Americans; the people of Mexico, Canada, and also the United States are North Americans; but we of the United States of America are the only people generally called Americans.

It is natural for us to think that our own country is the best and greatest. But we should always be very certain just how we rank among the many countries of the world before we begin to make assertions. The only way to determine just how we rank in the world is to compare our country with others in all the ways possible. Let us see just how the United States compares with other countries of the world.

We do know that we are considered by the people of all countries as one of the seven great powers. The other great nations are Great Britain, France, Germany, Italy, Russia and Japan. The advice of our country is nearly always asked when great questions or problems that affect many nations are being considered. But how does our country rank among the great powers? This is a hard question, and will require much careful thinking and the consideration of many things.

Two of the things that determine the importance of a country are area, or size, and the number of people there are. This does not mean, of course, that all large countries are important countries, but it is true that most of the important countries are large. The British Empire, Soviet Russia and the Chinese Republic are all larger in area and have more people than we have. France and her colonies have more square miles of land than the United States, but the population is less than ours.

When we are comparing the areas of the various countries, the amount of land suitable for cultivation should be considered, however, for unless the land can be used to grow crops or feed grazing animals it is of little value to the people. Soviet Russia has the largest area of productive land; the British Empire and the United States come next. Less than one-half of our entire area is considered suitable for the production of crops. This is undoubtedly surprising to some, but we are much better off in this respect than most countries. Some of our area does not have enough rain for crops and is given over to sheep- and cattle-herders. Large portions are mountainous and ill-suited for farming, and other sections are swampy. All this is shown by comparing the figures in the following table:

	Area	*Productive Land*	*Population*
	Sq. mi.	*Square miles*	
British Empire	13,400,000	1,000,000	441,600,000
Soviet Russia	7,500,000	1,460,000	125,000,000
Chinese Republic	4,277,000	not given	320,000,000*
United States	3,740,000	879,000	118,000,000†
France and her colonies	5,600,000	not given	93,000,000

* Estimates range from 300,000,000 to 400,000,000. † 1920.

WHY AMERICA IS THE GREATEST AGRICULTURAL COUNTRY

Although our country stands third among the countries of the world in area of productive land, we easily stand first in the total amount of our crops. Our country grows nearly three-fourths of the entire corn crop of the world. We grow more wheat than any other country. We fall far behind many countries in the growing of rice. We grow only a small part of the sugar-beets and sugar-cane of the world, but we lead all the other countries in the number of bales of cotton produced. We grow, most years, more than half of the cotton of the world. We also produce nearly one-half the tobacco of the world, one-fourth the oats and hay, one-fifth of the world's wheat and flaxseed, more than one-eighth of the barley, and one-fourteenth of the potatoes. As for live stock, we have more horses than any other country except Russia; more cattle than any other country except India and Argentina; more sheep than any other country except Australia; and by far the greatest number of swine. The United States may thus be considered the greatest agricultural country in the world.

We do not cultivate our land so carefully as do the people of Japan, China, India, or most of the European countries, and the yield per acre is not as great as in these countries. By the use of machinery, however, each American farmer multiplies his energy, and even his time, many times, and is able to produce far more than a farmer in any of the other countries. How much more is shown by a comparison of the number of farmers in the United States with the total number of farmers in the world.

WHY THE AMERICAN FARMER PRODUCES SO MUCH

There are probably not more than 10,000,000 farmers and farm laborers in the United States. In the world there are about 250,000,000. Yet see what wonderful producers we are! One reason for our great success in farming is that so many of our farmers own their own land and are anxious to improve their farms and keep them in good order. Besides this, the farms in general are large enough to yield an income that enables most of the American farmers to buy machinery, build good barns, outbuildings and houses, and equip their farms with the necessary live stock. The chief reason, however, for the farmer's great success in the production of crops is his extensive use of machinery. Besides enabling him to produce more, machinery lessens the amount of drudgery in farmwork that is so common in most countries. Certainly the farmers of our country have happier and easier lives, live in better houses, have more modern conveniences, and are better educated than in any of the other countries in the world. In no other country does so large a proportion of the farmers have automobiles, telephones, pianos, talking machines and radios, daily newspapers, magazines and books. Nearly a third of the farms of the country have automobiles, and considerably more than a third of the farmhouses have telephones.

OUR RANK AS A MANUFACTURING COUNTRY

It is difficult to tell just which is the greatest manufacturing country, for

data are difficult to obtain. Certainly the two greatest at present are the United States and Great Britain. Great Britain is the mother country of the British Empire, but there is not very much manufacturing in the Empire outside of Great Britain.

In most branches of manufacturing we produce far more than does Great Britain. We smelt more than twice as much iron ore, and in cotton-manufacturing we use nearly twice as many pounds of cotton, but do not make so much fine goods. We are not as important in manufactures using wool and flax, but lead all countries of the world in the manufacture of silk products. In many other kinds of manufactures we also lead. We lead in the making of automobiles, agricultural machinery, railroad equipment, aluminum goods, typewriters, sewing machines, rubber tires, electrical goods, and scores of other things.

Our prominence in manufacturing is due to many causes, one of which is the great amount of coal we mine. We mine most years about 500 million tons, while Great Britain "raises" less than 200 million, and Germany about 150 million in late years (1921). We pump far more petroleum (oil) than any other country —in fact, about two-thirds of the world's production. We also lead in the mining of copper, zinc, lead and phosphate rock. No country in the world is using as much water power as we are, and, with the exception of parts of Africa, we have the greatest amount yet to be developed. We have the greatest known store of coal in the world, and our store of iron ore is large. We have other great stores of raw materials which may be used in manufacturing.

We have seen that the United States is probably the greatest agricultural country in the world. Many agricultural products pass through some form of manufacturing before they are ready for the consumers. We lead the world in the production of lumber, furniture and planing mill products. While we have been using our forests much faster than they are growing, we still have more standing timber than any other country except Soviet Russia (European Russia and Siberia), and, probably, Brazil.

All these great developments in agriculture and manufacturing could not have been except for the great number and great mileage of railroads. We have more than one-third of the railroads of the world. The railroads of the United States, put end to end, would form eleven parallel tracks around the world. We have more than 263,000 miles of railroads, while no other country has much more than 40,000 miles. In the miles of telegraph and telephone wires we excel by far any other country.

Some Ways in Which We Are Behind Some Other Countries

While we lead all other countries in many things, we are behind many European countries in some very important ways. Some of the universities of Europe are probably greater than any we have. In music, art and architecture we are in general behind. Other countries have more great writers. Many artists and musicians of America go to Europe to complete their education. Many Americans go abroad each year to Great Britain, France, Italy, and many other European countries to see the great architectural creations—the cathedrals and public buildings—and to visit and study in the great art galleries and museums. One of the reasons for our backwardness is that our country is so young. We have been so busy developing, as we say, our resources and making wealth that we have given far less attention to art, architecture, music and literature than some of the countries of Europe. But we are making progress in all these lines. This generation is building more beautiful homes and public buildings, and is enjoying more beautiful paintings, sculptures, landscapes, both natural and man-created, than past generations. It is for the boys and girls of to-day, when they have become men and women, to see that the beginning thus made is pushed forward more rapidly than in the past.

Why We Should Be Glad We Are Americans

When we compare our country in all respects with other great countries of the world, we can be proud of it and should be glad that we are Americans. Some countries surpass us in some things, others in other things, but in most of the things that go to make a country great we lead or hold a high rank. In no other country do the people in general have so many of the good things of life, have such convenient and comfortable homes,

and have so much to look forward to as in the United States.

In the pages that follow you will learn more about the various sections of our country—what the people do for a living, what industries there are in each section, and what each section contributes toward making our country great. Some sections excel in the production of lumber, some in grain; others in fruit, dairy products, cotton, tobacco, coal or iron-ore. What the people work at in any region is nearly always determined by the opportunities which that region offers. What the people produce in any region is nearly always determined by one or more of the following: climate, soil, density of population, nearness to market, mineral resources, and power resources. If, in reading the pages that follow, you try to determine why people have certain occupations and why they produce certain things, it will be easy to remember what they work at and what they produce. This is the way to study geography. Boys and girls should know the geography of their country, and, in fact, of the whole world, in order that they may vote intelligently and be good citizens. It would take too many pages to tell why every citizen should know geography. As you read about the different sections of our country see if you cannot find some reasons.

The divisions of the United States followed in this series.

In all the succeeding volumes of our book the first story deals with some one of the sections of the United States as shown upon the map above. The stories and the pictures will give you a good idea of this wonderful country of ours.

Map, courtesy U. S. Department of Agriculture.

If you look at the two maps on this page you will see the reason for the upper one. The divisions on it follow very closely the natural divisions on the lower. You will be referred to this relief map constantly in the nine stories of the different sections which follow in our book.

Photo, Ithaca Engraving Company.

Entering Geneva, a manufacturing town on Seneca Lake, New York.

THE NORTHEASTERN STATES

PART I

DIFFERENT students of geography group the states of the Union somewhat differently. The Census Bureau, for example, makes nine divisions. A convenient grouping, however, is Northeastern, Southern, North Central and Western, and this is the division we shall follow in our stories of the sections. Naturally we shall begin with the Northeastern states.

This group includes the six New England states—Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island; the three states sometimes called Middle Atlantic—New York, New Jersey and Pennsylvania; and two states, Maryland and Delaware, which are sometimes classed as South Atlantic; eleven states in all. This section is one of the most important of the Union. Though it includes less than six per cent of the area, it has almost thirty per cent of the population and a large proportion of the wealth. Rhode Island is the most densely populated state of the Union, Massachusetts is next, and New Jersey is third.

Nine of these states—all except Maine and Vermont—were among the original thirteen, and through their ports the greater part of those who came to settle the country have arrived, from the days of Henry Hudson onward. Except for Virginia and the Spanish settlements to the south, this was the earliest area of our country settled by white men. The earlier pioneers, after crossing the Atlantic Ocean, were willing to turn their backs to the sea and to set to work to gain a living from the land. But they found the conditions different from what they had known in Europe: the soil in most places would not yield so abundantly, and the climate was more severe. After periods of suffering and privation, especially in New England, it became evident that agriculture would not support a large number of people. Some of the people moved westward in search of more promising lands; others turned back to the sea and began to build ships; and others continued to till the soil.

The difficulty of making a living from the soil had taught them to be economical. Those who went out into the West, going farther and farther as the settlements advanced, carried their New England ideas of thrift and industry with them. Wherever they went they set up little bits of New England. Hundreds of villages and cities in the West show the influence of their New England founders to-day, not only in these things we have mentioned, but also in their attitude toward religion and morality, and in the high value they set on education.

After the War of 1812 many men who had accumulated wealth by trading turned to manufacturing. The falls and rapids so common in this area became a valuable resource as power for turning waterwheels. Manufacturing became, and remains to-day, the dominant industry of the region. Though New England has been prosperous since she turned away from agriculture to manufacturing, never-

SPRING AND FALL IN NEW YORK STATE

New York State grows delicious apples, and the orchards where the fruit is raised are a dream of beauty in the spring when the trees are in bloom. This picture shows an orchard in Ulster County, where the blossoms appear a few days later than those in orchards lying in more southern parts of New York and in New Jersey.

Photo, Ewing Galloway.

The grape-growers no longer depend entirely upon the market for table grapes, for many tons are converted into the delicious grape juice which you all know. This is a Concord vine; in the corner the purple clusters have been gathered for the presses.

Photos, courtesy Welch Grape Juice Company.

FARM LANDS UNDER SNOW AND SUN

In some parts of New Hampshire the snow comes early and stays late, but this farm scene is quite as charming in winter as in summer. The hilly nature of the New England countryside adds to its variety and picturesqueness. In the picture below we see a stretch of level farmland bordering a river farther south. Photo, George Brayton.

Here Washington crossed the Delaware on Christmas night, 1776, to strike the Hessians at Trenton. The smiling landscape on the left is the Pennsylvania side, and Washington Crossing Park is at the end of the bridge. There is also a state park at the New Jersey end of the bridge. © Aero Service Corporation.

theless the children of New England have continued to wander down to the present day. In 1920 over 600,000 New Englanders lived in other sections of the Union. Even far-away Texas had over 7,000, Washington over 20,000 and California over 78,000. Only one state, Mississippi, had fewer than a thousand residents of New England birth. Wherever they have gone they have made themselves felt. There is no means of knowing how many people of New England ancestry are to be found in other sections.

Farther south the soil is better suited to agriculture

Southward from New York City conditions for settlers were somewhat easier. The extended lowlands of the Coastal Plain offered better fields for cultivation, and fewer people went West. Before the Revolution, however, there was a great movement southward from Pennsylvania. Though the early settlers of New England were chiefly English, many Germans and Protestant Irish came to settle in Pennsylvania, and it is chiefly these who went southward through the valley to Virginia, North Carolina and South Carolina, though many remained, and their descendants live in the state to-day.

However, many restless pioneers did turn their backs upon the Middle Atlantic states to try their fortunes in the West. Away from the Coastal Plain conditions similar to those in New England prevailed, and here, when the opportunity offered, the people turned from agriculture to manufacturing. Since about the year 1800 agriculture has declined and manufacturing has increased in this group of states, with the exception of one Census year, 1880. The financial panic of 1873 and the hard years following closed many banks, and there was much failure and closing of mills. The people turned again to agriculture, and in the 1880 Census there is noted an increase in agriculture. But before 1890 conditions had been adjusted, manufacturing was again increasing, and the people deserted the fields and went back to the shops.

Why the land as a whole is not suited to agriculture

Centuries ago most of this part of the United States was invaded by a great glacier. This ice-cap pushed as far south as central New Jersey and central Pennsylvania. It scraped practically all the soil from the hill-tops. When finally warmer weather prevailed, and the glacier melted, the boulders and soil which the glacier carried were dumped here and there over the land. This material, which contained every grade of soil, from boulders of considerable size to clay, is known as boulder-clay. Most of the hill-tops received only a scanty supply, from six to ten inches at most, while in many cases ledges were left bare. To be of permanent value for agriculture land must have, besides a top soil of from ten to twelve inches, a subsoil of from five to eight feet to hold a reserve supply of water.

Much of the soil on the hill-tops left by the glacier does not have this subsoil. The moisture that is received from the frequent rains is evaporated by a few days of sunshine. This soil will yield little, and trees that try to grow upon it are stunted because of the lack of moisture. Berries, however, thrive in such localities, and the land may eventually be devoted to this purpose.

Why the many stone walls were built

Again, this glacier dumped over part of this area great quantities of boulders. The pioneer farmer had to clear his fields of these. Since he did not wish to carry them far, he piled them up into the stone walls which help to make the landscape so attractive to-day. In some areas walls of this character are so numerous that it is difficult to cultivate the fields; in others the walls are built five feet thick. If Lincoln had been born in New England he might have gained a reputation as a stone-piler rather than as a rail-splitter. It was frequently said by way of a joke in earlier days, before the stones were picked up, that it was necessary "to sharpen the sheep's noses" so that they could graze.

All these were discouraging features, and if agriculture was to be the main industry, the population, it was certain, could never be large. In the petition to the General Court of Massachusetts for permission to found a village on the present site of Worcester it was stated that the land in the vicinity would support about thirty families, and the petition was granted for that number. Worcester to-day has a population of 193,000. How can you account for the difference? Again, the land as a whole

THE WORK OF RUSHING WATER

Photo, Ithaca Engraving Company.

Pinnacle Rock in Buttermilk Falls Glen, now a state park. Photo, Ithaca Engraving Company.

Photo, courtesy Horace H. Nye.

These pictures of rocks and falls in northern and central New York show how water wears away stone. Taughannock Falls, 212 feet in height, are the highest sheer falls east of the Rockies, while the Ausable Chasm in the Adirondacks, shown at the right, is a picturesque sight.

is hilly. Small areas of level land exist, especially along the banks of the larger rivers and along the Coastal Plain in New Jersey, Delaware and Maryland, but apart from these there are few extended level stretches. A hillside farm is very often attractive to look upon, but it is likely to be unprofitable if the farmer must compete with farmers in the prairie regions, where much of the farmwork may be done by machines. Tractors are desirable for a farmer to-day, but the upland fields of thin soil, the steep slopes of the hillsides, and the rocky character of much of the soil make the use of these machines difficult.

How much land is left for farming

Again, most farms are small, and tractors pay only on large farms of level land. Think of a tractor in an area where every fifty or one hundred feet the pioneer farmer has built a stone wall of the boulders which he took from the soil. When it is realized that practically all of New England is upland territory or mountainous, that New York is largely covered by the Catskill Mountains and the Adirondack Mountains, that there is little left of Pennsylvania after the Piedmont Belt and the Appalachian Highlands are eliminated, that all of the western part of Maryland is in the Highland region, there appears little space left for profitable agriculture. Yet there are some good farm areas in this region.

The failure of many attempts to farm this upland area is shown by the number of abandoned farms in this section. New Hampshire and Vermont are covered with these abandoned farms; in one town in Rhode Island 35 per cent of the entire area was advertised as abandoned a few years ago; and in central New York the number of abandoned farms is still increasing.

What types of agriculture pay in this region?

Nevertheless, some types of farming are successful. In 1923 New York led all the states in the production of potatoes, and Maine stood fourth. So nearly even are these two states, however, that the rank changes from year to year. Potatoes are bulky, and shipping is expensive. Consequently they are generally consumed near where they are raised. Aroostook County, Maine, however, is one of the most noted potato-raising regions in the country. It is situated in northern Maine, far from the cities of the coast. Raising potatoes here would have been an impossible enterprise in the early days had not factories for converting the potatoes into starch used up the bulk of the supply.

Dairy products, especially milk, demand a large population close at hand. In 1923 New York was second among the states in the number of milk cows, and Pennsylvania was fifth. The entire area has a high record in this respect. The hillsides make good pasturage, and hay may be grown with little difficulty. In fact, hay is one of the most valuable crops of the section, and in some states it is the leading crop. Frequently we do not think of hay as a farm product, because most people probably think that grass will grow anywhere and anyway, but, as a matter of fact, it is cultivated to a degree. Land is selected for it, and the return from the hay crop is as definite as the return from the corn crops of the Middle West.

Where vegetables for the cities are raised

Possibly the best and most extensive agricultural area in the Northeast is the Coastal Plain section, which extends from Long Island southward to Florida. This is a strip of lowland bordering the Atlantic Ocean, about fifty miles wide in New Jersey, but widening in the south to about two hundred miles. Acre for acre it does not compare favorably with the rich limestone soils of Pennsylvania or the flood plain of the Connecticut River, but as a whole it will outclass any other region, such as the Piedmont and plateau and mountain regions. Near the great centres of population truck farming is a profitable industry. Long Island and New Jersey, near New York City, have a market for vegetables and small fruits.

Nearly every state in this section has some special type of agriculture. Some of these are not important, but others are. The cranberries on Cape Cod, in Massachusetts, and in New Jersey; the apples in New York and Pennsylvania; the tobacco in the Connecticut valley and in Pennsylvania and Maryland—all these, and others, speak of considerable activity in agriculture. They are all money crops, that is, crops raised for selling, in contrast to food crops, which are raised primarily to feed the family occupying the area. It is the food-crops farmer, the descendant

IN THE WOODS AND ALONG THE ROADS

Photo, Ewing Galloway.

Among the tall pines of Maine are many summer camps where city people find health and pleasure.

Photo by De Cou; copyright, Ewing Galloway.

This avenue of birches near Bethlehem, New Hampshire, is one of the most beautiful of country roads.

Photo, Philip B. Wallace.

The wild beauty of the Alpine gorges is found in a Philadelphia city park, along the valley of the Wissahickon.

Photo, Royal Studio.

The Du Pont Highway which crosses Delaware is one of the best roads in America. This is the section near Ellendale.

of the age when everyone cultivated the land for his own food, shelter and clothing, that is losing ground and abandoning his farm. The money-crop farmers are increasing in number, and are to-day the successful agriculturist.

These facts will show you how the Northeast ranks as a farming section. Four-fifths of the whole area of Iowa is yielding crops, but only a little over two-fifths of New York is under cultivation, and one-fifth of Rhode Island. In Maryland conditions are a little better, and nearly half the land is producing crops.

However, in spite of all the disadvantages we have mentioned, the value of the agricultural products of these eleven states is large. New York and Pennsylvania especially are important agricultural states. In 1919 New York ranked eleventh in total value of all farm products, and Pennsylvania was thirteenth.

Now let us turn to another product of the land which is just as much a crop as hay, namely trees. Besides their usefulness for lumber, their beauty makes them worth while.

Photo, courtesy Boston & Maine Railroad.
Maple-sugar camp in Vermont.

Originally the Northeast was covered with forests. The early settlers found them a great hindrance to the cultivation of the soil. The clearing of the land of these forests began at once, and it has gone on steadily. There was a time when it looked as if no forests would remain in the Northeast, but now a halt of the wasteful cutting has been made and more scientific tree-harvesting has been introduced. The northern part of this area is in the Northern Forest belt, which yields spruces, hemlocks, birches and sugar maples; to the south of this belt, including all of Rhode Island and Connecticut and parts of New Jersey, Pennsylvania, Delaware and Maryland, is the Hardwood Forest belt, containing oaks, elms, hickories and chestnuts; and a small section of the Coastal Plain is in the Southern Forest belt, which yields in great quantities the yellow pine. The Northern Forest belt has but 30 per cent of its original stand of timber, and the Hardwood belt but 21 per cent. However, thousands of acres of these cut-over lands have been replanted, and the good work is still going on.

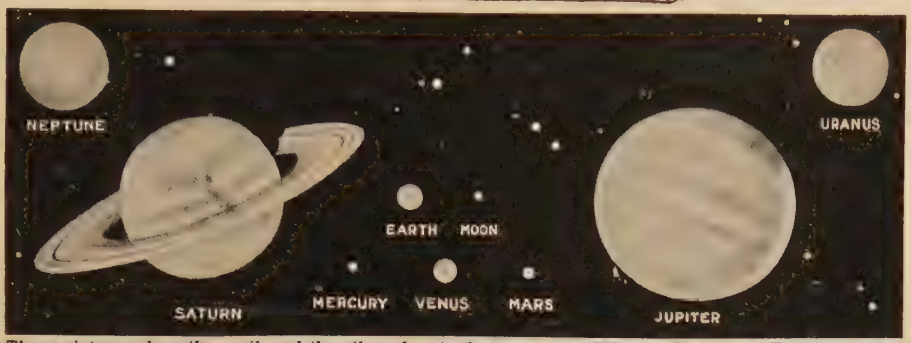
In 1850 New York led the states in lumber production, followed in turn by Pennsylvania and Maine. Massachusetts was in seventh place. Since 1900 no state in the Northeast has been included in the first eight states arranged in order of production. The products of the lumber industry are still important, however. Some of the furniture factories located in early days near timber supplies are still in operation. New York is among the six states of the Union which produce two-thirds of the furniture.

A second extensive use of timber in this section is for pulp which is turned into paper. New York leads in the number of wood-pulp mills, and many such mills are found over the Northeastern region, since the spruce is a particularly good pulp-making wood. In 1919 Maine consumed 1,300,000 cords of pulpwood; New York, 1,100,000 cords; Pennsylvania, 500,000; and New Hampshire, 375,000. Note that New York has the most pulp mills, but that Maine consumes more pulpwood.

Much wood is still used for fuel, especially in rural communities, and much goes into building. It would be hard to get along without our forests, but we are using them much faster than they are growing; and unless we use less and grow more, our children will have little wood. It would be difficult to think how we could get along without wood.

The sugar maple yields maple-sap, from which come maple-syrup and maple-sugar, and the stories of this enterprise make fascinating reading. Do you know what "sugaring-off" is? Vermont and New York lead the country in this industry.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 3583.

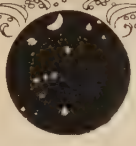


These pictures show the earth and the other planets that move round the sun in space. They are shown here in their different sizes as compared one with another; Jupiter is 1,200 times as big as the earth.

THE OUTER PLANETS

JUPITER, SATURN, URANUS AND NEPTUNE

CONTINUED FROM 3293



WHEN Mars is passed in our journey through the heavens we come on planets which seem to belong to a different brood. Though they are still members of the family of the sun, they are unlike the compact inner globes, for their journey round the parent sun is much longer.

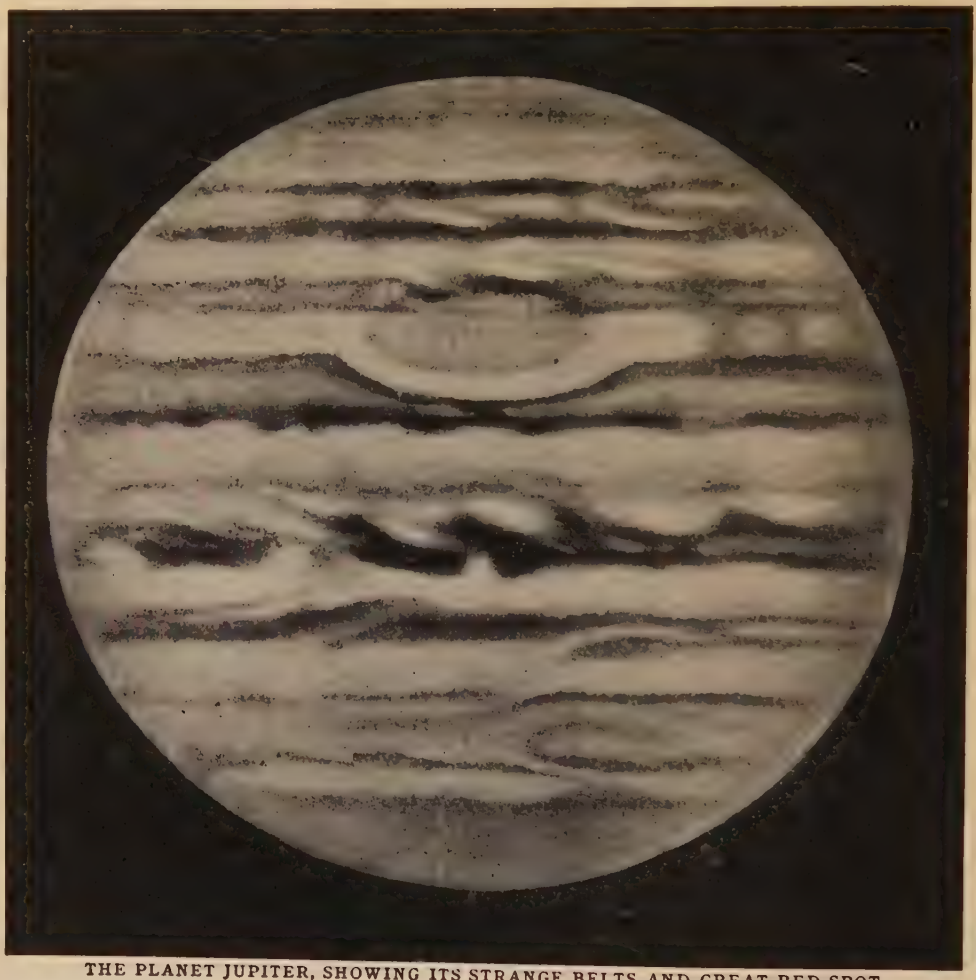
Jupiter is the one most resembling the sun in stature and appearance, even in habits, for Jupiter is more than equal in size to all the other planets put together. It has a family of nine moons of its own. Like the sun, it has spots, and its surface is not solid. But we must not press the likeness too much. Jupiter, though more than a quarter of a million miles round its equator, and huge enough to have twelve hundred earths packed in it, has not the mighty bulk of the sun. Though it is a hot and unsettled globe, it sends out no heat that can be measured.

Jupiter, when looked at with our best instruments, seems to be a dull yellow, with bright spots and bands and white markings that are sometimes darker and sometimes red—there is a famous one called the Great Red Spot—and sometimes striped in blue or crimson. The white spots are like eggs; all the markings seem smooth-edged; and they are continually changing. Even the Great Red Spot, which startled astronomers by its appearance some fifty years ago after it had long been lost, is now not red but gray. Sometimes, however, a rosy tinge suffuses it as if it were fed from below. It has made a nest for itself into which the planet Mars might be fitted, for it is 30,000 miles long and 7,000 miles broad. This monstrous growth seems to be nearly immovable among the swirling belts of cloud that hide the planet's surface.

Some have thought that Jupiter is so nearly red hot as to send out light, but this is not very likely, and it is quite possible that up among the clouds, which are all that we can see of it, the temperature is not very high. But it is an unsettled planet, which in millions of years to come may shrink and harden. At present, though it is so large, it is light—not very much heavier than sea-water; and it spins with a tremendous speed, so that a spot on it travels round at nearly 25,000 miles an hour. But it moves more slowly round the sun than the earth does, only a little more than eight miles a second, and so long is the path that Jupiter takes 4,332 of our days on the journey.

We have already spoken of its family of nine moons. Three of them are

larger than our own moon and a fourth is about the same size; and these all move round Jupiter very fast, one in less than two days, the slowest of them in just over a fortnight. There is yet another moon, a tiny one, which shoots round in less than a day, but then come four moons farther out, the most leisurely of them all. Saturn is, like Jupiter, an unsettled planet, but it is at an even earlier stage than Jupiter. It is the lightest of all the planets. It would float on water. It bulges a good deal at its middle, and its surface is so light that what we can see of it is very unlikely to be either solid or liquid. Most of this



THE PLANET JUPITER, SHOWING ITS STRANGE BELTS AND GREAT RED SPOT

which takes as much as three years on its journey.

From Jupiter to Saturn is a long journey, except when taken by light, for Saturn is 886 million miles from the sun, whereas Jupiter is only 483 million miles distant from the sun.

In some ways Saturn is the strangest of the planets. Jupiter has been called a semi-sun—something between a settled planet and the flaming orb which lights bulging globe, 74,000 miles in diameter, is therefore heated, and boiling vapors are always whirling about as they cool. Like Jupiter, Saturn moves slowly round the sun, six miles a second, but its journey takes 29½ of our years. Its day is a little longer than Jupiter's, or over ten hours; and yet another resemblance is in its family of moons, which number ten. They have all been given names. The biggest, Titan, is larger than our moon;

another, called Japetus, reflects much more light at some times than at others, so that we know it is not round; and all of them except Phœbe hurry round Saturn in times reckoned in hours or days instead of years. One thing distinguishes Saturn from all others—the rings which encircle the planet. It has been proved by the spectroscope that they are neither gas, nor liquid, nor unbroken solid, but uncounted myriads of tiny moonlets.

Saturn and its rings that are believed to be made up of millions of tiny moons extending outward for 40,000 miles beyond the planet.

The innermost ring of these is dusky like crape, and we can see the body of Saturn through it; the second is bright and broad, but still thin; and outside it is a duller band, perhaps double, and a little torn; parts of this dull band look, says a Greenwich astronomer, "puckered and snipped as if to form a straight strip of material into a circular band." All these three bands joined in one are 40,000 miles broad, but only 100 miles thick—or perhaps we should say thin. The moonlets may be rocks like those of an avalanche, or pebbles, or dust. They may be even smaller than the dust which whirls down our streets; they may be like the dust which follows a comet.

What Galileo called his "optic glass," the little instrument the Italian astronomer had made—really the earliest telescope—first revealed to the watchers of the skies these dazzling rings of light. It looked as if the planet were triple, because the rings stood out like spokes. At the sight, so wondrous and strange,

Galileo says his amazement was inextinguishable. The amazement remains inextinguishable after these hundreds of years. Later telescopes showed that the bright apparitions were not handles of the planet, as some called them; and thousands of eyes and minds turned on them have revealed something of their real character and fate; yet none can look at them without a feeling akin to awe. Nothing is like them anywhere else in the skies; the imagination must falter when thinking how, to anyone who stood on Saturn, their vast triple bow would stretch glittering across the Saturnian skies—a sight so majestic that one would almost fear to hear the clash of the contending multitude.

Saturn's rings as they appear over a period of eight years of the planet's journey round the sun.

The shadow of these rings falls on the unstable quaking surface of the planet so as to make a perpetual twilight over a band as broad as a continent of the earth. To astronomers, as well as to curious spectators of them, the rings are the subject of endless thought and speculation about their movement, their origin and future. The sight of them aided Laplace in framing his great idea that a nebula broke into rings and threw them off to give birth to the sun and the planets.

Farther yet in space lies Uranus, a greenish planet not so great as either Saturn or Jupiter, moving in its journey even more slowly, spinning at about the same speed, unsettled as they are, but heavier, bulk for bulk, than Saturn. It is 34,900 miles across, so may be reckoned a giant planet compared with ours. Its journey round the sun at four and a quarter miles a second occupies 84 of our years. It bulges, and it has certainly four moons, which have all been given fairy-like names—Ariel, Umbriel, Titania and Oberon—and skip around it with fairy-like speed in a few days.

These facts are the resemblances to other members of the sun's family; and so is the length of the "day" of Uranus, which is some ten and three-quarter hours. But there are some reasons for believing that, whereas all the other planets spin in the direction of the movement round the sun, Uranus may spin in the opposite way.

As Saturn is to Jupiter, so is the most distant planet that has yet been seen, the planet Neptune, to Uranus. Neptune is 2,791 million miles compared with the 1,782 million miles which Uranus is distant from the sun, and, traveling more slowly (at 3 2-5 miles a second), will be over 164 years before it comes round again to where it stands to-day. But it is about the same bulk, a trifle lighter than Uranus, though only a little heavier than water, and a few thousand miles less in diameter. Its day is very hard to calculate. It has certainly one moon, called Triton; it may have another.

But it is true that we know little of this lonely distant planet; we can learn more of it only by the aid of the beam of light which, having fallen on it from the sun, is reflected back to our eyes; and that beam of light has so far to go and return that it cannot tell much. For Neptune is so distant that to anyone who

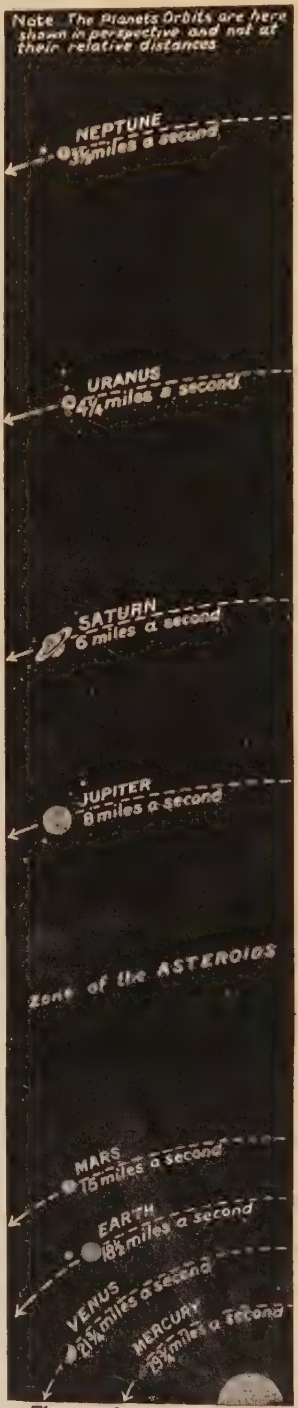
SATURN FROM ONE OF ITS MOONS

Here our artist shows us the beautiful sight Saturn would be from one of the ten moons that revolve around the planet almost on the same plane as the rings.

stood on it the sun would appear no larger than Venus does to us; and the disks of the earth and Venus would be so near the sun that the Neptunian would not be able to see them at all.

How distant and how hard to follow are these outermost planets, will appear when we say that for a hundred years after Uranus had been seen in the telescopes it was reported as a star, and Neptune was not found at all till the middle of the nineteenth century. Its discovery was the result of our learning that the planets influence one another. Uranus, when at last proved to be a planet, gave astronomers a puzzle to solve, for it never seemed to be moving as it should. The only answer to the puzzle was that some unknown planet must be pulling it out of its path. Was it possible to calculate how and by what it was disturbed, and where the disturbing body was? It was possible, but the problem was a tremendous one in mathematics. Nevertheless, it was begun by a young English mathematician, John Couch Adams. He began to study it in 1843, and for two years he worked alone at the problem. Then, on October 21, 1845, he sent to the Astronomer Royal, Sir George Airy, the results of his calculations which gave the mass and the movements of the "Unknown Planet" which was disturbing Uranus, together with the place where it would probably be found.

It was a tremendous piece of work, before which even the greatest mathematicians might have quailed, and we may charitably believe that Sir George Airy thought it unlikely that so young a man could have solved the problem. Moreover, Adams was himself a very modest young genius and took no pains to press his discovery. So it happened that his paper remained pigeon-holed.



The speed of the planets. The farther away the planets are from the sun the slower is their motion. They are drawn here in perspective; their relative distances are shown in the right-hand picture on page 23.

But in that very autumn, while Adams' work was disregarded, the great French mathematician Le Verrier was persuaded to take up the same task, and in the next year he, too, produced calculations of the Unknown Planet's place and movements. As he was a renowned mathematician, his views obtained immediate recognition; and being a man of energy, he wrote to Professor Galle, of Berlin, asking him to turn his telescope to a certain spot in the heavens on a certain night, when he would find the planet so laboriously sought and so wonderfully indicated. Galle did so. The planet was there, and a new epoch in astronomy dawned.

Is there still another unknown, undiscovered planet beyond distant Neptune? The way some of the planets behave suggests that there may be one or more. For more than forty years some astronomers have looked for it; and the giant telescopes of America have often been turned to places in the sky where it might be. There is something still unexplained about the way Uranus and Neptune move. Is an unknown planet invisibly pulling them out of their course? If such a planet there be, then, according to the calculations of Professor Pickering, it ought to be some fifty-one times as far from the sun as the earth is, it should be about twice as heavy as the earth is, and it should journey round the sun in 373½ years. Perhaps we shall know certainly some day.

NEXT STORY OF THE EARTH PAGE 3535.

Workers in a beetroot field in northern France.

WHERE SUGAR COMES FROM

CONTINUED FROM 3323

THE history of civilization might be written round the sugar bowl. We could hardly live without sugar, so important is it to us as a food and as a luxury. Yet not so very long ago sugar was seldom seen in the homes of the poor. Sometimes they had a little honey. This was the great sweet in olden times. The Bible often mentions it. So recently as sixty years ago sugar was extremely expensive. But the sugar-growing industry has become one of the most important in the world. To-day sugar sells for much less than it did half a century ago, and a greater quantity is grown.

The Sugar Beet.

For ages and ages the sugar-cane was the great source of supply, and it is wonderful to think that at one time all the sugar came from a single spot in the world. It would not be safe to say that it was in Bengal that the sugar-cane first grew, but it seems certain that in Bengal the process of extracting the sugar from the cane was first learned by man. Nearly eight hundred years before the birth of Christ the Chinese copied the valuable art from the people of Bengal. About 800 A.D. the Persians began to cultivate the sugar-cane. It was the Persian doctors who first introduced the use of sugar into medicine—a fact for which all young patients will bless them. When the Arabs established colonies on the shores of the Mediterranean they grew the cane there, and thence it slowly made its way into Spain.

Little by little it was carried to other warm countries of the world. Missionaries took it with them and taught natives to cultivate it; travelers carried it to the lands which they explored; and eventually sugar-cane was grown throughout the West Indies, the East Indies, the warm lands of the southern United States, in many South American countries, and elsewhere. For many years it was the only important source of sugar.

It was the discovery of the richness of the beetroot in sugar that lessened the importance of the sugar-cane. Before the World War beets were grown in enormous quantities in Europe, but the European production has fallen off since. Germany, Austria, France, Russia, Belgium, the United States and Canada all grow sugar-beets. Attempts have been made to develop the industry in England and in Ireland, and perhaps success will come some day.

Suppose you were asked how many kinds of sugar there are. You might

answer that you know lump sugar, granulated sugar and powdered sugar. Perhaps your mother has in the pantry some sugar which looks like damp sand and which she calls "brown sugar." You know maple-sugar also, and rock candy. These answers are right so far as they go, but they do not tell all; for there are dozens of kinds of sugar, and we must find out something about what sugar is.

Sugars are made up of carbon, hydrogen and oxygen combined in different proportions and in different ways. They are found in many living things, both vegetable and animal. The sap of many trees contains sugar. Peaches, grapes and oranges are sweet because they contain sugar. So are honey and milk. Grains are made up partly of sugar. Onions, beets, peas and other garden vegetables contain sugar. Many flowers contain sugar, for which the bees eagerly seek. Not all of these sugars are alike, and sometimes the same fruit, or other substance, will contain several kinds of sugar, and all of these cannot be used for the same purposes.

Several of these sugars are valuable foods, for sugar is a food without which we cannot be healthy and strong. If we try to get along without it, unless we eat plenty of sweet fruits we shall soon feel a strong craving for sugar in some form or other. Of course, we can eat too much of it, just as we can eat too much of other foods, but the right quantity is as necessary as bread. Sugar is a food that produces heat and energy, and that is one reason why children are so fond of it.

Sugar obtained from milk is called milk-sugar or lactose; that from fruit is called levulose or fructose; that obtained from grain, potatoes or other starchy substances and from some fruits and vegetables is called glucose. The common sugar we know best is called sucrose or saccharose. It is obtained principally from the sugar-cane, or from the sugar-beet. Maple-sugar is also a sucrose, but it would be too expensive to get it pure. Besides, maple-sugar is worth more with its own flavor. Sorghum also produces sugar, but it is very difficult to purify. Let us see how sugar is made.

How sugar is made from the sugar-cane

Sugar-cane will grow in only a few of the United States, such as Louisiana and parts of Texas, though much is grown in the Philippines and in the Hawaiian Islands. It has a smooth, jointed stem and looks not unlike a cornstalk. It grows from six to twenty feet in height, and from one to two inches in thickness. It is a perennial; that is, the roots live and send up new stalks every year when the old are cut away or become ripe and produce seed. In the United States the cane does not have time to produce seed before the colder weather comes, as it does in the hotter countries.

The crop which comes from the old roots, however, does not produce as much sugar as the first crop, and the next year the yield will be even less. Since seed is difficult to get, it is the custom to plant stalks, or pieces of stalks, in furrows. At every joint in the cane is a bud, which will sprout if it is kept warm and moist. From these joints young plants spring up and grow rapidly. Thus a part of every plantation should be planted every year.

When the cane is ripe, it is cut off close to the ground, the leaves are stripped from the stalk, and the top is cut off. The canes are then taken to the mill, where they are often shredded, or broken, so that the heavy rollers between which the cane is crushed can force out more juice. In some places where they do not have the best ways of making sugar, the cane passes between only one set of rollers, but usually there are several sets. Between the sets the crushed cane is sprinkled with water, which helps to get out more of the sweet juice. In some mills the crushed cane is placed in large tanks of water to extract the sugar. Much of it is left, in spite of all the effort. The weight of the juice left in the fibre is as great as the weight of the fibre itself. This fibre of the cane after it has passed through the rollers is called "bagasse," and much of it is burned under the evaporating-pans. Many attempts to make it into paper have been made, but they have not been very successful.

How the sweet juice of the cane becomes sugar

The juice is far from being sugar. It is a grayish or greenish liquid of which only a small part is sugar. There are many impurities which must be removed, as well as much water. Some of these impurities are taken out by skimming

SUGAR-CANE IS CUT READY FOR USE

In hot countries sugar is obtained from the sugar-cane, and workers in Peru are planting the cane.

Here the sugar-cane is being harvested on a plantation in Louisiana near New Orleans.

This picture gives a good idea of a sugar-cane plantation. It shows workers in Jamaica cutting down the cane which will be carted to the factory to have its sugar extracted by processes shown in later pictures.

and straining, but others are removed by adding lime and other chemicals which cause the impurities to settle to the bottom. Sulphur is sometimes used to whiten the juice.

When the juice has been purified, it goes to evaporating-pans, where some of the water is driven off by heat. In some places this is done in open kettles, but the better mills evaporate in a vacuum, as in the salt works. Since the juice will boil at a lower temperature in a partial vacuum than in the open air, water can be driven off in the form of steam without danger of burning the syrup. When enough water has been driven away, the thick syrup goes to the "strike pan," where more water is evaporated and the crystals of sugar are formed. Then the mass is emptied into the centrifugal machines. These are tanks which revolve very rapidly. Much of the liquid that is left, which we call molasses, is thrown out through tiny holes in the sides of the tanks.

The sugar which remains is still not the sugar you know. It is damp, sticky and not very white. Some of it is sold as brown sugar, but more goes to the refinery, where it is melted, again treated with chemicals and filtered through bone charcoal. The purified syrup is then evaporated again, and the product is the white sugar in the form of lumps, tiny grains or fine powder which we know. Some of the molasses is sold for food, and some is again heated to get more of the sugar. Finally, much of the refuse molasses is fed to cattle or horses, which eat it greedily.

How sugar is made from sugar-beets

Though sugar-cane grows only in warm countries, the other plant which gives us so much sugar can be grown much farther north. The fact that some beets contain large quantities of sugar was shown by a German, Andreas Sigismund Marggraf, in 1747, but little use was made of his discovery for a long time. About 1800 one of his pupils started a small factory, and while the wars with Napoleon were going on, some sugar was made. After peace, little beet-sugar was made for many years, but for a half century or more the quantity has been increasing very rapidly.

By careful selection of seed and by good cultivation the beet has been much improved. It grows larger, contains more juice, and that juice has twice as much sugar as the beets which were used a hundred years ago. The sugar-beet is grown from seed, which must be planted every year. When the beets are ripe, they are pulled out of the ground, the tops are cut off, and they are taken to the factory. There they are washed, cut into small thin slices and placed in great tanks. Hot water is forced through these tanks and dissolves out the sugar from the slices. The syrup, which contains about the same amount of sugar as the juice of the cane, is then drawn off, and the chips are pressed to remove any syrup that is still in them. They are fed to cattle or used as fertilizer.

Raw sugar from beets is not good to eat

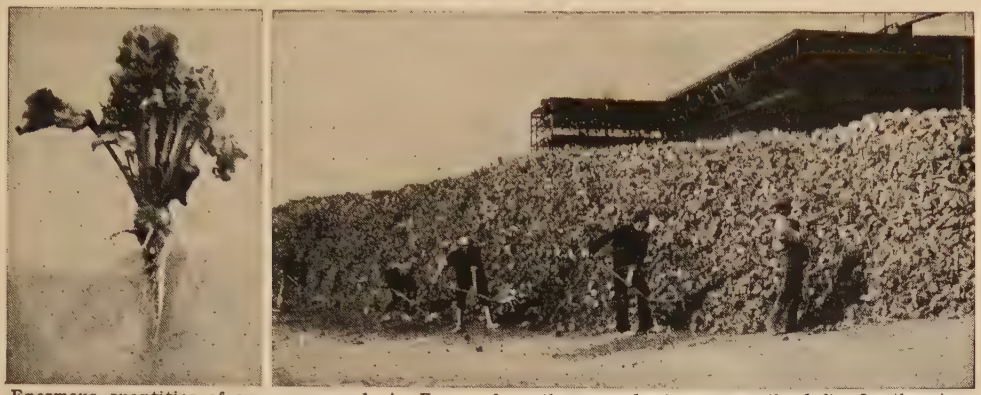
The juice, or syrup, like that of the cane, is full of impurities, though they are not quite the same. It is filtered, purified, bleached, evaporated, and put through the centrifugal machines in much the same way as the cane-syrup. The brown sugar from the cane is good to eat, as you know, but the raw sugar made from beets contains substances which are unpleasant, and it cannot be used until it has been through the various processes in the refinery. Likewise, the molasses from the cane is good for food, but beet-molasses is not.

Though the sugar-cane and the sugar-beet do not look at all alike, the refined sugar made from them is the same. You can be sure that the lump of brown sugar you eat came from the cane, but you do not know whether the sugar you use at breakfast came from a cane or a root.

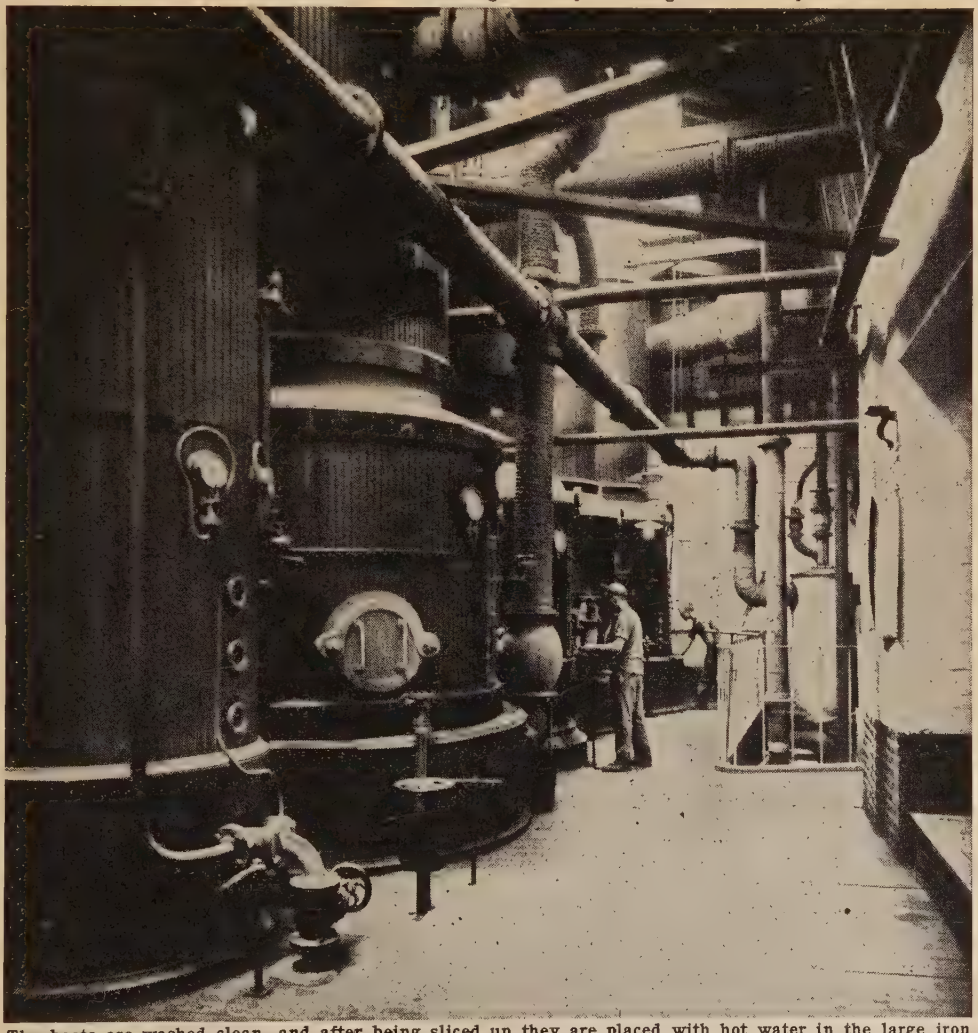
Much of the sugar we eat is imported

You see that making sugar is not a simple matter. It is a long way from the sweet juice of the cane, or the beet, to the lump sugar on the table. That lump has perhaps come a long way. Though the United States produces both cane-sugar and beet-sugar, and Canada produces some beet-sugar, both of these great nations use much more than they make and must import every year many millions of pounds from Europe, the West Indies or the Far East, part cane, part beet. Both countries are among the greatest consumers of sugar in the world. Cuba produces the most cane-sugar, while Germany has led in beet-sugar.

MAKING SUGAR FROM BEETS



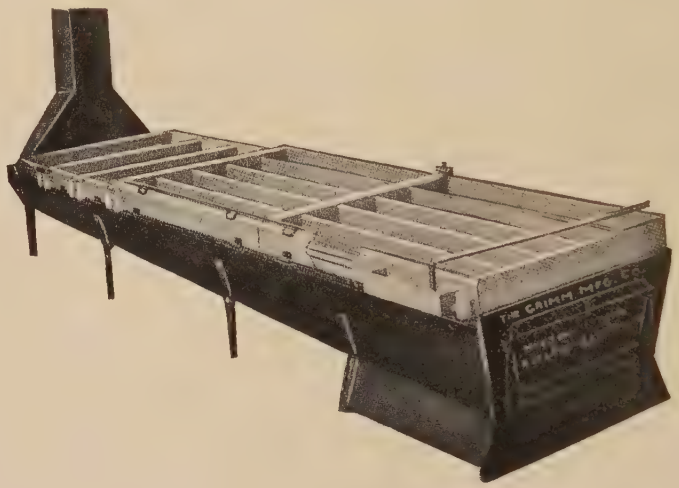
Enormous quantities of sugar are made in Europe from the sugar-beet, seen on the left. On the right millions of beets that have arrived at the sugar factory are being stacked ready for use.



The beets are washed clean, and after being sliced up they are placed with hot water in the large iron vessels seen here, called diffusers, where the sugar is dissolved out of the beets. The water passes through cylinder after cylinder, at each stage becoming more saturated with sugar.

SOME OTHER SOURCES FROM WHICH WE GET SUGAR

We have mentioned that certain kinds of sorghum will produce sugar, though at a high cost. Most of the sorghum grown is fed to cattle, but sometimes certain varieties are crushed and some of the water is evaporated. The result is syrup or molasses which is much liked by many people. In the East Indies some sugar is made from a kind of palm. You can learn more of some of the sugar plants in that part of our book beginning on page 2531. Milk-sugar, used to sweeten food for babies and invalids, and also in medicine, is prepared from the whey after the curd has been taken out.



A modern evaporating vat, by which the sap is turned into syrup.

Another sugar you all have seen is maple-sugar, made from the sap of the maple trees, chiefly from the sugar maple *(Acer saccharum)*. This tree grows freely in North America from Newfoundland to Georgia and westward beyond the Great Lakes, and is valued for shade and timber as well as for sugar.

When the early colonists came to America they could not afford to import much cane-sugar, but they soon discovered the sugar maple. In fact, the Indians made syrup from the sap. The methods were very crude, but soon maple-sugar took its place beside honey as a source of sweetness. Only the rich could afford sugar brought from abroad. While the methods have been improved where the number of trees is large, on thousands of farms maple-sugar and maple-syrup are made to-day in very much the same way as a hundred years ago.

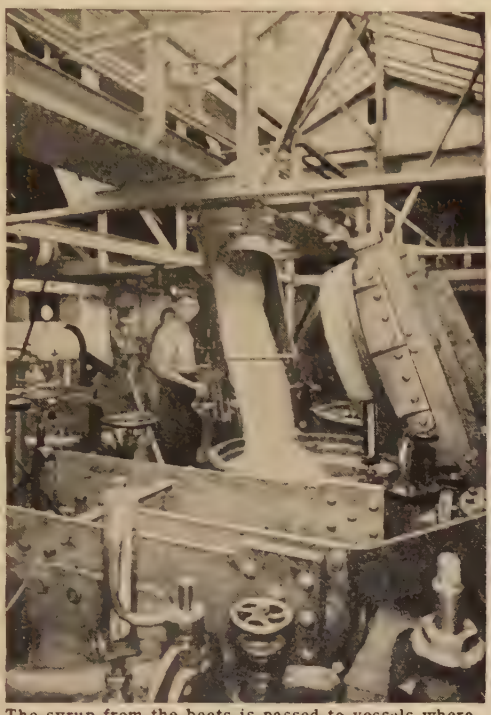
When the winter is coming to an end preparations are made to "tap the sugar bush." Small holes are bored into the trees, and wooden or metal tubes are driven in. To these, pails of wood or metal are hung and the sap drips down into them. The sweet juice is collected every morning and carried to the boiling-place. It is poured into a large iron kettle over a fire, often in the open air.

The juice is only faintly sweetish, and the water is driven off by boiling. The impurities which rise to the surface are skimmed off. As the sap thickens care must be taken to keep the syrup from burning. Finally the sugar begins to crystallize as the syrup is stirred, and the thick liquid is poured into molds to cool, and maple-sugar is the result. If maple-syrup is desired, boiling is stopped after some of the water is driven off but before the sugar has begun to crystallize.

In establishments where maple-sugar and maple-syrup are made in a large way, trees are tapped and sap is collected as we have described. The sap is boiled and the water evaporated indoors in large vats such as you see on this page. More can be made at a time, and there is less danger of burning. The province of Quebec and the state of Vermont are the largest producers of maple-sugar. Quebec also makes the most maple-syrup, but New York makes more than Vermont.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 3545.

THE REFINING OF THE SYRUP BEGINS

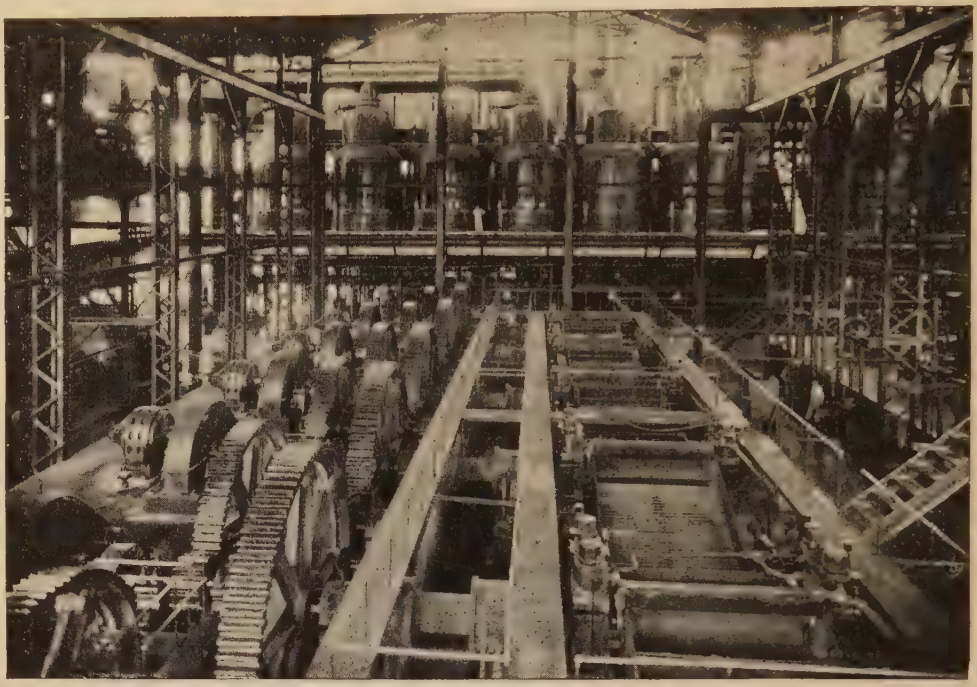


The syrup from the beets is passed to vessels where it is mixed with lime to get rid of impurities.

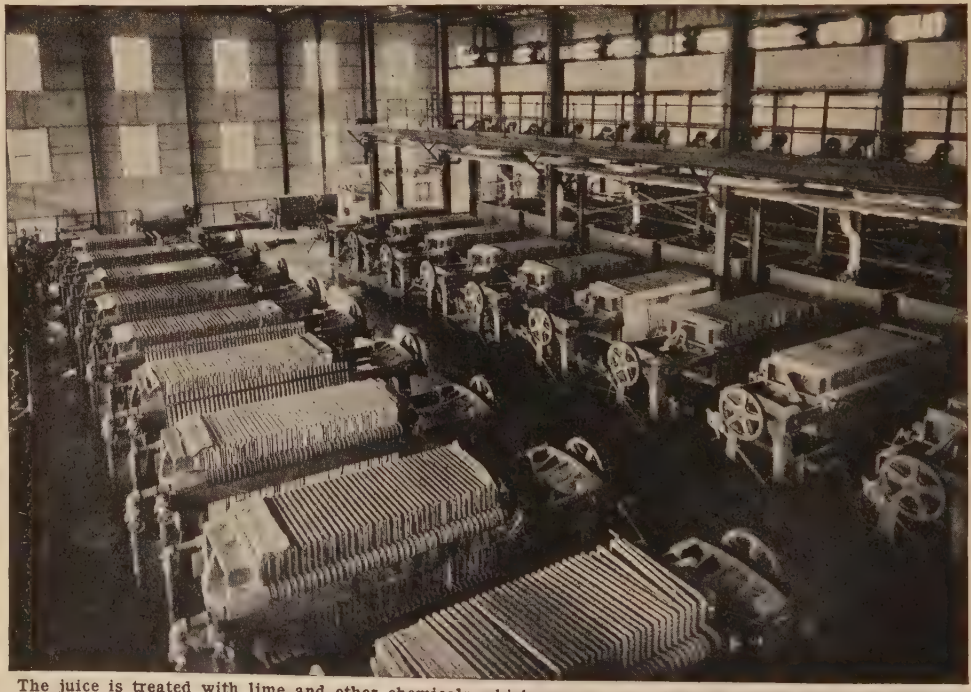
This shows the great pumps that drive the syrup through pipes to different parts of the factory.

The pulp of the beet that is left after the sugar has been extracted is removed from the diffusers, squeezed dry in special machines, and sold as cattle food. Here the pulp is being loaded into cars.

CRUSHING CANE AND FILTERING JUICE



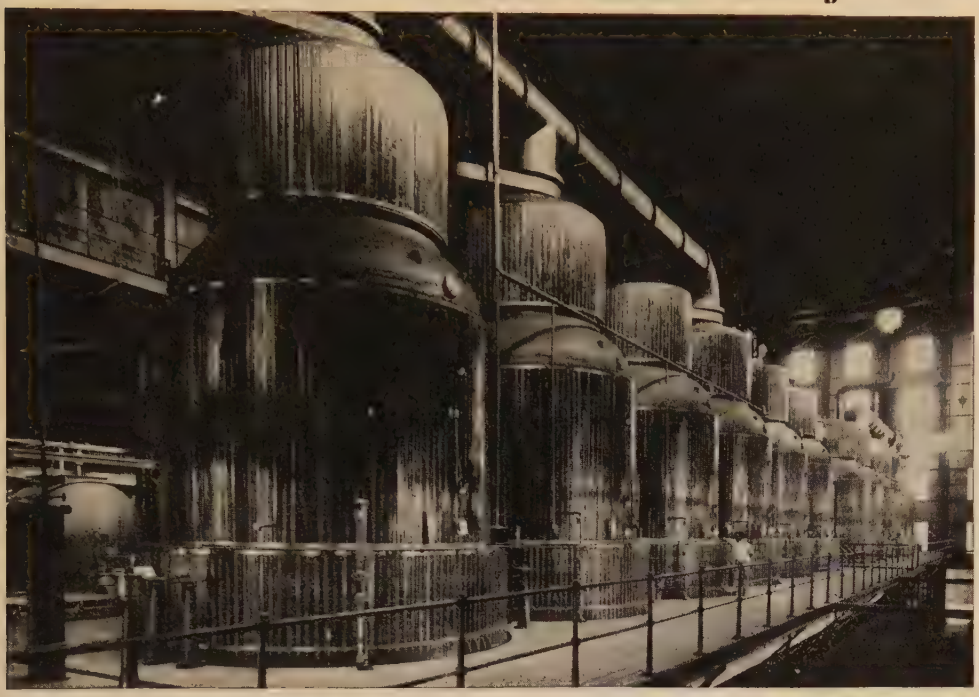
As the cane is carried by the moving belt it is crushed by the pairs of rolls set at intervals. After passing through a set of rolls the cane is often sprayed with water, which is squeezed out by the next pair, carrying some of the sugar remaining in the cane with it.



The juice is treated with lime and other chemicals which cause some of the impurities to settle. These and the bits of cane and other foreign matters are then removed by these filter presses through which the clear juice passes.

Photos on this page and the next by American Photo Studios, Havana.

EVAPORATING WATER FROM THE JUICE



The amount of water in the juice is very large. In these huge evaporators a partial vacuum is maintained, and the juice is made to boil at a very low temperature as it passes through them. Much of the water is removed without burning the sugar, which then goes to the vacuum-pans, where more water escapes.

The sugar is now beginning to crystallize in these great cylinders at the top. It drops to the centrifugal machines below, which are run at high speed, and the molasses is thrown out through the perforations in the inner vessel. The sugar is dumped through the floor, and is carried by the elevator to the bins on the upper right. It is now ready for the refiner.

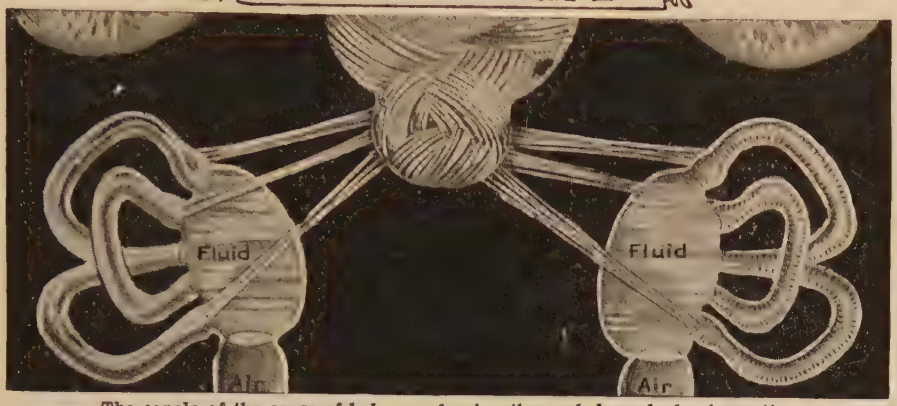
OBTAINING SUGAR FROM THE MAPLE TREE

Millions of pounds of sugar are obtained from the maple tree. Holes are first bored in the trunk.

Pails are hung on the trunks to receive the sap that oozes out. Maples are tapped late in winter.

In the morning a man goes around emptying the pails and replacing them. From two to four holes are bored in a tree, but soon sap ceases to come.

To transform the sap into sugar it was formerly boiled in pans over a wood fire, the scum was removed, and the sugar crystallized as it cooled.



The canals of the sense of balance, showing them whole and also in section.

OUR WONDERFUL CANALS

CONTINUED FROM 3310

THE mechanism of hearing in the inner ear is sufficient to make the bone that contains it the most wonderful in the body. There is another reason why this bone is of very great importance. It contains also another organ of a wholly distinct sense. This lies close beside the inner ear, and is, indeed, in more or less direct communication with it.

We find that the fibres which have come from the real inner ear all run to a certain part of the brain. The business of this part is hearing. But we find that the fibres which have come from this other organ all run to an entirely different part of the brain which has nothing to do with hearing at all, but with balance, or equilibrium.

The sense of balance is, in a way, a sense that tells us about the outside world, like hearing or vision. That is, it *does* tell us where the outside world is in relation to our bodies. But it is quite unlike the senses we know so well. It is not arranged to receive anything from the outside world at all, and so, unlike the eye or ear, it has no connection with the surface of the body. We may say that this is one of the senses which tell the brain about the body rather than about the world outside.

Before we study the organ of this sense we must notice, in the first place, that it is helped by other means. We do not depend for our balance entirely on the organs of balance in the base of the skull, though we certainly cannot balance ourselves without their assistance. When we stand, for instance—and standing is a much more difficult matter than we usually suppose—our power of balance is greatly helped by the feelings we get from the soles of our feet. If something is painted on the soles of our feet so that the skin there can no longer feel, we cannot stand or walk so easily as we usually do. This happens when the soles are painted with chloroform or ether, and when they are burned or scalded.

Have you ever realized that the act of walking is very complicated? We stand balanced on both feet. We lift one foot, and throw the centre of gravity forward. We begin to fall, in fact, and we should fall if the forward foot did not come against the ground and save us. Then we balance ourselves on that foot for a fraction of a second before beginning to fall forward again. The rear foot swings forward and prevents. So walking is really balancing, falling and recovering.

But the sense of balance is helped also by the eyes. As long as the eyes are open, even a person who is not helped by the soles of his feet may balance himself. With his eyes shut he may yet balance himself if he stands with his feet far apart; but if he puts his heels together and shuts his eyes he will probably topple over.

How a man can balance on a tight rope

People, however, can stand with their heels together, and with their eyes shut, thus doing without the assistance of sight, if the organs of balance in the skull are all right, and if guidance is coming to the brain from the soles of the feet, and also from the muscles and joints of the legs. If we set ourselves the task of balancing on a very narrow plank, or on a tight rope, our eyes become more useful, and unless we are very skillful indeed, they are quite necessary. Everyone knows how the tight-rope walker keeps his eyes steadily fixed on a certain point, and so greatly helps himself. If he is very skillful, he may walk on the tight rope even though he bandages his eyes. A foolish man named Blondin once blindfolded himself and wheeled a woman in a barrow along a rope stretched over Niagara. It was a very remarkable thing to do.

However, the eyes and the feelings from the skin and joints and muscles are all unimportant compared with the guidance we get from the special organs of balance. No one was ever yet able to stand or walk on the ground, much less on a tight rope, in whom these organs were not working properly. Now we must learn what they consist of.

The six little tubes which tell the brain our movements

In the hard bone that contains the inner ear, and close to the inner ear—on each side of the head, of course—we find this organ of balance. It consists of three tiny tubes, in shape like half a circle. The proper name for a half-circle is a semicircle, and so we call these tubes the *semicircular canals*. The head of every human being and of all the higher animals contains six, three on each side, all filled with fluid.

Just as the nerve of vision runs to the eye, and the nerve of hearing to the ear, so the nerve of balance runs to the semicircular canals. The ends of the nerve—that is to say, the ends of the countless nerve-fibres which make the nerve—lie close to the fluid that fills the canals. If that fluid moves, or if the pressure on it changes in any direction, the nerve-fibres know about it.

Think for a moment of a child's block, which we call a cube. If we want to measure it we find that it can be measured in three directions—from top to bottom, from side to side, and from back to front. We may pick up any solid thing and we find the same thing is true. We may want to measure a room, and we find again that the same is true; we must measure the floor in both directions, and we must also measure the height of one of the walls.

What we say about this is that space has three directions—or three dimensions, to give the usual word—and when we move our head it must move in one or more of those three directions. All the possible movements of the head are either in one of these directions or in a combination of them. The business of the organ of balance is to acquaint the brain with every movement of the head, and it must therefore be so constructed that all possible movements shall register themselves in it.

The moving fluid in the six little canals in our heads

This is done in the most exquisite way by the provision of three canals on each side of the head. These three canals are arranged in correspondence with the three dimensions of space. One canal lies on its side, so to speak, or is horizontal; and the other two are upright, but at right angles to each other. As there is an organ of balance on each side of the head, we may think of the canals in pairs, and there is no doubt they act in pairs. For instance, the horizontal canal on each side of the head acts with its fellow when we shake the head, or when we spin round.

The consequence of this arrangement is that every possible movement of the head has a corresponding effect on the fluid inside one or more pairs of these six canals; and the centre of balance in the brain is informed. This centre of balance probably exists in the cerebellum—the little brain. Sometimes we have an illness in which the organ of balance is thrown out of action; and just as a person whose eyes are injured cannot see, so those in whom the organs of balance are

injured cannot balance. They suffer from persistent giddiness.

It has also been proved that where the injury affects only certain of the canals, the giddiness corresponds to the direction of these particular canals. "The body of the animal always moves in the direction of the cut canal." If it is only the horizontal canals that are thrown out of action, then we are all right so far as nodding the head is concerned, but directly we start shaking the head we become giddy, and if we do not receive support we topple over.

The history of the semicircular canals is very interesting. The lowest kind of creature with a backbone is the fish, and we find in it no trace of these canals. Now, the fish is very clever at balancing itself, and shows no signs of giddiness. Probably we can explain why the fish manages without canals if we remember how great the pressure of water is on the surface of the fish, and therefore how much more information the fish must get from its skin than we are able to get from ours. The fish also depends upon its eyes. It is said that if they are covered the fish will not swim.

As we ascend the scale of backboned animals we find these semicircular canals. If our statements as to their use are correct, we should expect to find them most beautifully and perfectly developed in birds, which could not succeed in flying without a perfect sense of balance. In flying, the bird gains little from the feet and legs, as we do in the very much simpler business of standing or walking.

It does, however, gain a great deal from the eyes, and this is probably the reason why the eye of a bird is so large in proportion to its body. Some birds will not attempt to fly at all if the eyes are covered. Men used to slip a hood over the eyes of their falcons, and the birds would then stay quietly with their owners and not try to escape.

A marvelous balancing feat—Blondin wheeling a woman across Niagara on a tight rope, blindfolded.

The eyes, however, are not enough, and the bird has need of the special organs of balance. You can see the reason, for the bird moves, and moves very quickly, in all three dimensions. That is, it moves not only on a level, but goes up or down as well.

So we find the canals at their very best in birds; and we know also that, as in our case, if the canals are thrown out of action the bird's power of balance is destroyed, and in flying it will make mistakes and show peculiarities corresponding to the particular defects in its organ of balance. It is probable that in this way we can find a good explanation of the peculiarity of what are called "tumbler" pigeons.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 3555.

LOUIS IX OF FRANCE ON HIS THRONE

Louis IX, usually spoken of as Saint Louis, was one of the best kings of France. He made good laws, which show remarkable humanity for the time in which he lived, and he established a court of justice in Paris, where he was not afraid to try the rich and powerful nobles who oppressed the poor peasants by making them work for little or no pay. He also founded hospitals and a great college. He was the highest type of ruler in the world at the time he lived, and was respected by neighboring kings.

Looking out from the English Embassy on the Terror of St. Bartholomew's Day in Paris.

THE BEGINNINGS OF FRANCE

CONTINUED FROM 3304

AS the English boy looks over from Kent toward the shadowy cliffs that are the edge of the great continent of Europe beyond, it is hard to realize that once upon a time there was no channel of ever-restless, dancing waves to part his corner of it from his nearest neighbor, France. But so it was in the times of the "very beginnings," for the same sorts of tools, the same sorts of bones are found north and south of the Channel. The wild men who made and used the tools, the wilder animals whose skeletons have been dug up and put together again, must have roamed freely over the lands that were then united.

Then, ages after the great western ocean had thrust long arms over the sinking land, and separated the country we now call Great Britain, Ireland and France, another race of men spread over the now divided countries, and raised great stone monuments such as we may see to this day at Stonehenge in Wiltshire, at Carnac in Brittany. As we come nearer to the dawn, we find that still the dwellers on the south are very much like those on the north of the separating waters, with their Druid priests and mistletoe boughs, and tools of bronze. It was the great Cæsar himself who began the written history of the Gauls, as he called the people whom he found in the country now known as France. It was the success that he had in subduing them that made him anxious to push across the Channel to the white cliffs of their British cousins. As time went on Roman civilization spread in Gaul even more than it did in Britain, and many are the remains of villas, temples and theatres scattered over the country which the soldier nation held for centuries. By means, too, of the fine roads—which the Romans built everywhere—traders passed right through the country, from the Mediterranean to the Channel, and then across to the "island in the mist" beyond.

Yet more the Romans did for Gaul; for when they could no longer hold the country, they left behind them a lasting influence on its speech, laws, customs and religion. The Romans, after bitter persecution at first, had supported Christianity so strongly

in Gaul that it was never wiped out again, as was the case in Saxon England.

Tribes of the same German family as the Angles and Saxons who conquered Britain about the fifth century gradually pressed into Gaul across the Rhine, and also into the Rhone valley, and they managed to get more and more of the Gaulish lands for themselves. The Gauls themselves moved westward.

How Clovis set up a kingdom of free men and called it France

One tribe proudly called themselves the Free Men, or Franks, and in the end their chief, Clovis, gained the country north of the river Loire, and called it Francia. He made his capital on a little island in the Seine, where already there had been a settlement. That little island is now the heart of the beautiful city of Paris, and on it stands the Cathedral of Notre Dame. Clovis married a Christian wife, who persuaded him to give up his old heathen religion.

What a wonderful scene it must have been, as Clovis and some 3,000 of his stalwart, long-haired warriors gathered round the saintly old Bishop Remigius, who baptized them on Christmas Day, 496, saying: "Adore what you have burned, and burn what you have adored."

Wild and bad times came after his death, full of enthralling stories of wicked queens and good bishops, strong soldiers and weak kings. The monasteries, as in the early troubled times in England, were the centres of peace. Scholars assembled in them to learn and study and to pray, and to write precious manuscripts—such as we can see now in the museums—which were then the only books.

The coming of Charles the Great, the hero-king of France

After a long line of "do-nothing" kings a strong man rose up to withstand a great invading army of fierce Saracens, men who were followers of the prophet Mohammed, and were the destroyers of civilization and Christianity. At the great battle of Tours, which saved Europe from bondage, Charles, the leader of the Franks, beat about with his heavy battle-hammer all through a long autumn day, till his men thought of the old god Thor of their ancestors, and called him Charles Martel, Charles of the Hammer. His grandson, Charlemagne, or Charles the Great, is one of the heroes of France, as Alfred the Great is of England. Like Alfred, he cared much to make good laws and govern his kingdom well, and to encourage people to learn and study. A thoughtful and good monk, Alcuin, went over from England to help him. He did much to improve trade, and by establishing fairs brought people together, and so helped them to know each other, and overcome foolish dislikes and prejudices.

Egbert, often called the first king of England, stayed for some time at the court of Charlemagne, and learned much that helped him to bring the rest of the small kingdoms under his leadership when the time came. For Charlemagne's chief ambition was to rule over a great dominion, and all his life he was busy drawing together the different states in the country, conquering wild tribes beyond his borders, doing battle with the Moors in Spain, and, in the end, he more than doubled the kingdom he had inherited. His heirs, however, soon lost much of what had been gained.

Why tears came in the king's eyes as he looked from his window

Part of his army, under his friend Roland, was attacked and overwhelmed when passing through a valley in the Pyrenees on their way back from the war in Spain, and this formed the subject of a great poem, The Song of Roland, which was sung and recited all over the west of Europe for centuries. When Taillefer, the minstrel, about 250 years later led the Normans to the battle of Hastings, which we read about on page 1565, his song, taken up by the whole army, was about the valor of Charlemagne's knights in this song of Roland.

There is a story told of Charlemagne looking out from his window on the Mediterranean and seeing the boats of the Northmen on the blue sea. They had come all the way from Denmark and other northern countries. We read on page 1432 how they were dreaded in England, and how they ravaged and burned on all the coasts. Charlemagne's eyes, we are told, were filled with tears as he watched the long, swift boats, and said to those about him: "I do not fear them for myself, but woe to those who come after me."

Within a hundred years what the great Charles had dreaded came to pass. His empire was divided up, in

the reigns of his weak descendants —the Meek, the Fat, the Simple, the Fool are some of their nicknames —and the dauntless Northern pirates and rovers pushed up the Seine and the Loire, plundering first and then returning to settle. Charles the Simple followed the example of Alfred by giving them part of his kingdom, so that the rest might be left in peace.

In Rouen, the old capital of Normandy, there stands a statue of Rollo, the first of the Norman dukes. He stands proudly pointing to the soil, and

THE BAPTISM OF CLOVIS, THE FOUNDER OF FRANCE

the words that are written on the base are "J'y suis, j'y reste," which mean "I am here, I stay here." There is a story told of him when he had to do homage to Charles the Simple for his newly-gained lands. It was his part to kneel before the king and kiss his foot.

"Never will I bend my knee to anyone nor kiss his foot," cried Duke Rollo, with blazing eyes. At last he was persuaded to let one of his warriors do homage for him. The Northman seized Charles's foot so roughly that the poor king fell over back-

CLOVIS II, THE BOY KING, RECEIVING THE HOMAGE OF THE CHIEF RULERS OF HIS TRIBE

Clovis, who was chief of one of the heathen German tribes of Franks, or Free Men, who settled in Gaul, founded his capital on an island in the Seine on which the Cathedral of Notre Dame now stands. He married a Christian and embraced her faith. Above we see him being baptized by Bishop Remigius on Christmas Day, 496. In the lower picture we see Clovis II at the age of five. He ruled more than a hundred years after Clovis I, and became king of all the Frankish tribes that had settled in France.

Photo, Messrs. Braun, Clement & Co.

ward, amid the loud laughter of those standing by.

As soon as the Northmen entered into quiet possession of the pleasant and rich country now called after them —Normandy—they settled down to cultivating it, became Christians, built churches and cities, and before long spoke the tongue that had become the language of most of the country from the time of Charlemagne—French, founded on the Latin of the old Romans.

THE FIRST FRENCH KING OF FRANCE, WHOSE HOUSE RULED 800 YEARS

Charlemagne himself spoke a German dialect, but he had to learn French, and the oldest written document in it is the oath taken by his grandson in the treaty which marks the beginning of the three great kingdoms of Italy, Germany and France.

We have seen in the story of Great Britain how William, Duke of Normandy, only six generations after his forefathers had settled on the south side of the Channel, determined to add England, on the north of it, to his possessions. We have seen, too, how he did it, and how England in consequence became mixed up with the quarrels and wars of the Continent through having kings who were also dukes of Normandy, and also what troubles arose later by English kings marrying French princesses, who brought large provinces in France as their marriage portions.

It was not, however, till the end of the tenth century that it could be said, "France has a French king." Hugh Capet, Count of Paris, was then chosen king by the great nobles who ruled over the various independent provinces acknowledging the king as overlord, and his descendants ruled France for eight hundred years.

THE FIGHTINGS OF THE FEUDAL LORDS, AND THE SORROWS OF THE POOR

Hugh's royal dominions were only a twentieth part of what is now France, and for many centuries the powerful feudal lords were constantly rebelling against the crown or fighting each other. This state of things made it very wretched for the poor, who were serfs, bound to work on the soil or fight for their masters. There were often terrible famines in those days, and sore was the want and oppression that prevailed all over the land.

One can fancy some of these poor creatures hanging on the edge of the excited crowd, listening to the eloquent preaching of the French monk who had returned from the Holy Land with sad tales of Jerusalem in the hands of the Mohammedans. When he urged his hearers to go and fight them, the tears rolled down their faces, and they shouted again and again: "Dieu le veut," which means "God wills it." As we have read on page 2587, this enthusiasm spread to England, and princes and knights, even the lion-hearted king himself, and thousands of English workers badly needed at home took part in the Crusades to take Jerusalem from the Turks.

One of the best of the French kings, Louis IX, whom we read of on page 2589, went twice to the Crusades. He made good laws, and founded hospitals and a great college, and established a court of justice at Paris, where the rich and powerful could be called to account for wrongdoing.

HOW THE BARONS SOLD FREEDOM TO GET MONEY TO SET JERUSALEM FREE

These rich and powerful nobles tyrannized terribly, not only over the poor country folk, but over the people who were better off in towns; for the towns, too, belonged to them, and they could make the citizens grind their grain and bake their bread just where they chose, and make them pay just what they chose for having it done; yet they gave them no voice in electing their own magistrates or settling the laws and taxes, and no freedom in trade.

Now, one of the good results of the Crusades was that in France they hastened the freedom of the cities, for often the barons who owned them wanted money so badly to go to the war that they had to sell to the citizens the rights they so much desired. Sometimes the king would help the citizens against the nobles in the struggle that went on and on through the centuries.

Many of the earlier kings of the House of Capet were weak, at a time when the Norman kings of England were great and powerful, as we learned on page 1565, so they were able to hold a large part of France. But when the strong Philip Augustus determined to increase his power, John the Coward was not the man to withstand him. By degrees Philip conquered Normandy and many

Charles the Great is one of the hero-kings of France, as Alfred the Great is of England. He gained a large dominion; but, above all, he encouraged people to study, having pupils of his own, as we see in this picture.

other lands held by John in France. Indeed, it almost seemed as if Philip would gain England, too.

Some years after the English patriot, Simon de Montfort, of Norman birth, began to take the first difficult steps toward forming a House of Commons, where the people could be represented, the king of France called a National Assembly to meet in the Cathedral of Notre Dame, in Paris. To this were bidden not only the nobles and clergy, but, for the first time, the representatives of the citizens. But these members never got so much power as the English Commons, and the French kings only called the "States General" thirteen times in 500 years. Absolute power was slowly and surely gathered more and more into one hand as the years rolled on.

We have seen on page 1682 that it was wretched enough for England, during the long Hundred Years' War with France, to have thousands of her strong men sent overseas to be killed, or to die of disease, or to come back ruffians, hardened to killing and stealing. But

for poor France, where all the battles were fought, where towns were besieged and plundered, where all the country was laid waste and provisions and treasures stolen, it was indeed terrible, and we can realize how widespread was the misery as we think again, looking at the map, about the "thunder of God" at Crécy, the "snowstorm of white arrows" at Poitiers, the tears of the gentle queen at Calais, the fine court of the Black Prince at Bordeaux. There is an old song still sung about the pleasant fields and orchards of Normandy, of which the chorus runs: "Jamais, jamais, jamais, les Anglais ne régneront sur nous," meaning, "Never, never, never, shall the English reign over us." It dates from these wars when Edward III tried to become king of France, and, indeed, called himself so, and added the white lilies of France to his coat of arms.

THE ENGLISH IN FRANCE, AND THE SAD STORY OF JOAN OF ARC

In a later chapter of this sad war comes the romantic story of the successes of King Henry V, owing to the disunion of France and the madness of her king. Henry regained much of the French land that had been lost, but, even if he had lived, he could not have kept the throne, which had only been offered to him by the nobles in a fit of passion against the Dauphin, the true heir to the kingdom. We read on page 1684 how Henry died at Paris, and was buried in Westminster Abbey.

In the disturbed times that followed his death, when the fortunes of France were at their lowest ebb, owing to the weakness of the Dauphin, afterward Charles VII, there stands out the wonderful story of Joan of Arc, which we read on pages 1684 and 5819. She was so persuaded herself that God called her to deliver her country that she succeeded in persuading others, too; and we see the simple peasant girl transformed into a leader of rough soldiers, on her white horse, with a white banner in her hand, so inspiring them with her enthusiasm and goodness that their courage revived, victory followed victory, and the French king was crowned triumphantly at Rheims, Joan, with her banner, standing by. It was a black and shameful day when Joan was burned by the English as a witch at Rouen, after the French and their ally had given her up to them. She had saved France, but its king held out no hand to save her from her cruel enemies. French national spirit had been revived by her courage and her martyrdom, and soon the English were driven from the land.

THE NEW WEALTH AND THE NEW IDEAS THAT CAME TO FRANCE AND EUROPE

At the Field of the Cloth of Gold, where costumes were very rich, the host of the brilliant party was Francis I, the first French king who ruled over the country from sea to sea, united under the royal power. The long wars against a common foe had made men act and suffer together. Formerly each baron had lived apart in his own strong castle; now Francis I gathered them to his court, and all sorts of extravagance and gaiety became the custom wherever the court was held.

France came in for her share in the great fortune that fell about this time to the old European world. Gold and silver to make coins could be had in plenty, trade began to flourish, new thoughts and ideas arose in men's minds as the New World and the New Learning came in sight.

The new religion did not take hold of the mass of the people, as in England. In spite of long and bitter disputes with the pope during the Hundred Years' War, the greater part of the people remained firm Roman Catholics. Protestants were called Huguenots, and were bitterly persecuted from the first. Calais, the only possession in France left to the English at the end of the Hundred Years' War, was taken by the French during the reign of Henry II, the son of Francis I.

THE WICKED MOTHER OF 3 KINGS, AND THE TERROR OF ST. BARTHOLOMEW'S DAY

Catherine de Medici, the wife of Henry II, was a very clever but wicked woman, the mother of three kings of France whose reigns dwindled miserably away, the result of their bad and idle lives.

The eldest, Francis II, was the husband of the beautiful and unhappy Scotch princess, Mary Stuart. We know how sadly she left her beloved France after her young husband's death (we can see her picture on page 4204), and what a miserable life was hers as Queen of Scots! Francis II was followed by his brother Charles IX. In his reign was the terrible massacre of St. Bartholo-

Louis XI was in some ways a good king of France. When he came to the throne his country was almost ruined by the Hundred Years' War. He strove to find out everything about his subjects, rich and poor. He was so earnest about this that he used to go alone and visit his peasants in their homes, as we see in this picture by Mr. J. Seymour Lucas, R.A., given here by his permission.

This picture shows how gentle and thoughtful for his poor peasant subjects Louis XVI, who was guillotined in the Revolution, could be. He was very unfortunate in coming to the throne when he did, as his grandfather, Louis XV, had ruled very badly and had taxed the poor terribly. For the first two years of his reign Louis XVI tried to carry out reforms, but a big war with England, and the influence of his queen, Marie Antoinette, rendered his efforts at reform useless, and the French Revolution broke out.

mew's Day, when the Huguenots were suddenly murdered, it is said, to the number of 2,000 in Paris, and 20,000 in France altogether. It was Catherine who planned this dreadful deed. The quarrel was not altogether on account of religion. The Huguenots were in a way also a political party, and some of their leaders were more interested in securing power for themselves than they were in advancing religion. For years the contest distracted France and did much harm. This was in August, 1572. This sixteenth century was full of cruel persecutions in the name of religion both in England and France, and in the former country were also years of wretched civil wars on the same account.

It is a relief to turn to Henry IV, called the Good, the friend of Queen Elizabeth and the hero of the battle of Ivry. He had sympathy with the poor, having been brought up in the country in a simple way, among peasants.

A POPULAR KING, A FAMOUS CARDINAL, AND SOME VERY BAD WOMEN

One of Henry's best deeds was to allow liberty of worship to the Huguenots, by the Edict of Nantes. This was a whole century before England allowed real freedom to those who differed from the established religion of the land. Henry was brought up a Huguenot, but turned Roman Catholic after he became king. "Paris is well worth a mass," he said in joke to his friends.

His wife, Marie de Medici, was not a good woman. Their daughter, Henrietta Maria, married Charles I, and her bad upbringing caused much unhappiness in England. Henry had a clever adviser, Sully, and with his help got the money affairs of the kingdom into order and reduced its tremendous debt; he also made roads and canals, and encouraged manufactures, agriculture and commerce, and France was very sad when he was killed by a madman in the streets of Paris.

A great minister, Cardinal Richelieu, did a great deal for France in the years that followed. He protected commerce and tried to keep order among the nobles, destroying their castles, reforming the government in the provinces, and taking away some of the old powers of the nobles and giving them to the crown. He did all he could to strengthen the power of the king, and did his best to increase the dominions of France and lessen the power of Spain. His work kept back the freedom of the people for years.

THE AGE OF GRANDEUR, AND THE PALACE WITH 4,000 SERVANTS AND 5,000 HORSES

After him came the "age" of Louis XIV. This king reigned more than seventy years, and during his long lifetime he saw the terrible Thirty Years' War on the Continent and, across the Channel, the stirring times of the Stuarts, the execution of Charles I, the Commonwealth, the Restoration, and the following sovereigns down to George I. In the struggle of the English people against the tyranny of the Stuarts, Louis XIV took the side of the kings, and when James II had to flee the country, Louis helped him with money and soldiers, and at last gave him a home till he died.

Many learned men and great poets lived in this age, and as French was much spoken all over Europe, their works were widely read and made people think and study. It was an age, too, when France spread beyond her own borders across the ocean, where years before bold Breton fishermen had crossed and started the great trade in cod. Now, devoted Jesuit missionaries followed Cartier and other explorers, not only on the St. Lawrence and Great Lakes, but down the length of the Mississippi, naming Louisiana, at its mouth, after the king, as we read on page 248.

It was an age, too, of great works at home—roads, canals and buildings. It took twenty years to build the huge palace of Versailles and to turn the barren lands about it into a splendid park by planting thousands of trees and bringing water by canal from a distance to form lakes and streams and waterfalls. It sounds like a fairy-tale to read of the 4,000 servants, 5,000 horses, 10,000 soldiers of the guard.

THE GROWING VANITY OF VERSAILLES, & THE GROWING MISERY OF THE POOR

Hundreds of courtiers all gathered about this enormous palace, where fêtes were held of extraordinary magnificence. What Francis I had begun a hundred years before in forming a gay court to live always about him, Louis XIV carried on in the most lavish way. He made his court the most splendid in the world, and insisted on his nobles' leaving

BEAUTIFUL NOTRE DAME DE PARIS

The Cathedral of Notre Dame is the most important church in Paris. It was founded in 1163 and completed about 1240. The three doors of the principal façade are decorated with fine early Gothic carving. The figures above represent twenty-eight kings of Israel and Judah. Above the central door is a rose window, and above it a third story consisting of a graceful gallery of arches on slender columns. The church possesses the Crown of Thorns and a fragment of the Cross.

THREE FAMOUS OLD CITIES OF FRANCE

Metz, capital of the department of Moselle, the old fortress-town of German Lorraine. The Moselle, here joined by the Seille, flows through it in several arms and is crossed by many bridges. The general appearance of the town is quaint, irregular and ancient, though there are several handsome modern streets. Metz, as a fortress, never succumbed to an enemy till 1870, when it was captured by the Germans.

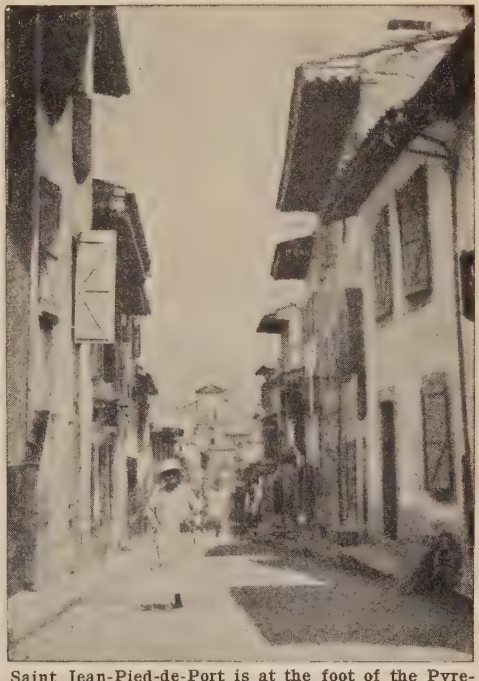
The Ill divides the city of Strasbourg into three parts, of which the central is the most important. Most of the streets in the heart of the city are narrow and irregular, with overhanging buildings.

This is the cathedral of Quimper in Brittany. It was erected between 1239 and 1515 and has a fine façade. Quimper is a very quaint old city. Traces of Roman foundations are still plainly visible.

QUAINT STREETS AND BEAUTIFUL BATHS

Nîmes, a city of southern France, is important both for its industries and its archæological treasures. Of the Roman remains the most celebrated are the amphitheatre, the Maison Carrée, a temple in the style of the Parthenon but smaller, the baths and the gates. Agrippa built the baths which are now in public gardens. The balustrades and statues were built in the eighteenth century on ancient foundations.

A quaint street in Dinard in northern Brittany. Dinard is a favorite resort of English and Americans in France. It is situated on a rocky promontory.



Saint Jean-Pied-de-Port is at the foot of the Pyrenees on the river Nive. Formerly capital of French Navarre, it was fortified by the engineer Vauban.

their estates in the country and living at Versailles, where they had nothing to do but stand around and watch the king at his toilet, or at his pleasures, and join in the dancing, play-acting, gambling and hunting which filled up the time. In the meantime, the lot of the peasants on the estates grew worse and worse, and throughout France unjust taxes were wrung from the people to pay for the extravagances of Versailles.

This age of Louis XIV was also celebrated for great generals, as well as for great writers, great expansion abroad, great luxury and want at home; for wars were constantly going on with Spain, Holland and England. Often these great generals gained most brilliant victories, which set France for a time at the height of her glory. But toward the end of the long reign, Marlborough and his allies, as we saw on page 1981, stopped the increase of the power of France, which so alarmed the rest of Europe, by winning battle after battle. When the old king lay dying, his great armies were destroyed, his fine ships were battered hulks, and treasures of precious lives and hardly-gained money had been poured out for naught.

This picture shows how England was joined to France thousands of years ago, before the western ocean spread itself over the land that now lies at the bottom of the North Sea and English Channel. Men and animals then wandered freely from England to France.

Many of the wars were about religion, for Louis hated Protestants and treated the Huguenots with such cruelty that all who could escaped to other lands, to the great loss of France, for these God-fearing, industrious people carried away with them their skill in manufacturing, to increase the prosperity of other countries through the silk and woolen trades.

Such was the state of misery to which the country was brought by famine and oppression that a great archbishop wrote to Louis: "The whole of France is one great hospital, a hospital without money." But the king only mocked; he cared not, so long as he could get money for his wars and palaces, and he could not see that France was like a great gilded statue with the wood inside all decayed. One of the sayings of Louis—the little man with high-heeled shoes and large wig—was this: "L'état c'est moi," meaning "I am the State"; and it expresses his ambition to be absolute master of everybody and everything.

When he died, lonely in the midst of state, the people waited, rejoicing and feasting, on the road to see the body of the grand monarch pass by to the royal tomb at St. Denis.

His great-grandson, who followed, cared for nothing but his own wicked pleasures, and during his long reign France lost Canada and her influence in India. Commerce was checked, and the state of the people was piteous indeed. Money was dragged from them for the king to spend in disgraceful luxury. He and a few nobles bought up all the grain in the kingdom, so that all must pay their exorbitant prices or starve. There was a gloomy dungeon prison in Paris then, the Bastille, and into it people were flung without trial or reason, men and women alike. The king used to sign orders for sending people there, and give or sell them to his favorites to fill in the name of anyone they wished to get out of the way. Many very clever men wrote at this time, attacking all this cruel oppression of the people. Sometimes these books were burned, and the writers shut up in the Bastille; but their words sank into the hearts of those who read them, and the rumblings of the coming storm could be plainly heard.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 3563.

PUSS IN BOOTS

CONTINUED FROM 3352

A MILLER had three sons, and on his deathbed he left his mill to the eldest, his ass to the next, and his cat to the youngest.

The youngest son was at first disappointed with his share of his father's property, but the cat said to him: "My dear master, buy me a pair of boots and a sack, and I will soon show that I am more useful than a mill or an ass."

So the youngest son spent all his money in buying his cat a handsome pair of boots and a sack.

The cat put on the boots, and then slung the sack on his shoulder, and went to a warren. There he opened the sack, put some bran in it, and lay down as if he were dead.

Soon a rabbit smelled the bran and ran into the sack. The cat at once caught the rabbit and killed it, and took it to the king and said: "Sire, the noble Marquis of Carabas desires me to bring you this rabbit. Boiled with onions, it makes an excellent dish, you will find."

"Rabbit?" said the king. "How delightful! I love rabbit, but my cook can never catch any. Pray thank your noble master for me."

The next morning the cat caught two partridges, and brought them to the king as a present from the Marquis of Carabas. The king was so pleased that he at once called for his royal carriage to take him and his daughter the princess on a visit to the neighbor who had sent him such fine gifts.

The cat hastened back to the youngest son, and said: "Come with me at once and I will show you a place in the river where you can have a good bath."

The cat took him to a spot where the royal carriage was about to pass, and told him to undress, and hide his clothes under a stone, and get into the water. He had just entered the river when the king and the princess drove by.

"Help! help!" shouted the cat.

"What's the matter?" said the king.

"Some thieves have stolen the clothes of the noble Marquis of Carabas," said the cat. "My master is in the water, and if he stays there much longer he will certainly get a cramp."

The king ordered his attendants to run to the palace and bring the finest suit of clothes they could find, and presently they returned with a gorgeous dress which the king had worn in his youth.

The youngest son put it on, and he looked so handsome in it that the princess fell in love with him as soon as he entered the royal carriage.

The king was also touched, and he whispered to his daughter: "That's just how I looked twenty years ago, when I went to woo your mother."

The cat was delighted at the success of his scheme, and running on in front of the royal carriage, he came to some wheatfields and meadows, and said to the people working there: "The king is coming, and unless you tell him that

these wheatfields and meadows belong to the noble Marquis of Carabas, you will be chopped into mincemeat."

So when the king passed by and asked them to whom the wheatfields and meadows belonged, they said: "To the noble Marquis of Carabas."

"Dear me!" said the king to the youngest son. "What a fine estate you have!"

The youngest son smiled in a bewildered way, and the king said in a whisper to the princess: "I was just as bewildered when I went courting."

The cat still ran on in front of the royal carriage, and passed through a forest, and came to a magnificent palace. In the palace lived the ogre to whom the wheatfields and the meadows really belonged, and the cat at once called upon the ogre, and said to him: "My dear ogre, what wonderful tales everybody tells about you! Is it true that you can change yourself into any shape that you please?"

"It is quite true," said the ogre.

And he at once changed himself into a lion.

"That's nothing," said the cat. "Anybody can puff himself up into something bigger than he really is. But it is only the wise who can make themselves appear smaller than they indeed are. Can you, for instance, turn yourself into a mouse?"

"It's just as easy," said the ogre, very conceitedly.

He then changed himself into a mouse, and the cat pounced on him and gobbled him up, and ran down and opened the gate just as the royal carriage arrived.

"Welcome, sire, to the palace of the Marquis of Carabas," said the cat.

"Dear me!" said the king to the youngest son. "What a fine palace you have! Kindly help the princess to alight."

The youngest son shyly offered his arm to the princess, and the king then said to her in a whisper: "I was just as shy when I went courting."

In the meanwhile the cat whisked into the kitchen, ordered an elaborate luncheon, and got all the choicest wines out of the cellar, and by the time that the king and the princess and the youngest son were seated at table, the repast was ready.

After making a very enjoyable meal, the king turned to the youngest son and said: "You are just as bashful as I was when I went courting. But I can see you are as deeply in love with the princess as she is with you. Why don't you propose to her?"

The youngest son then asked the princess to be his wife, and she consented, and in a short time they were married in great state. The cat came to the marriage feast in a new pair of boots with crimson leather tops set with two rows of the very finest diamonds, and a sword-belt of plaited mouse-tails.

THE FAIRIES AND THE HUNCHBACKS

EVERY Irishman, from Bunclody to Enniscorthy, knows of the fairy fort between Tombrick and Munfin.

In appearance it is only a level field encircled by a high mound. But Patsy Blake, a poor little hunchback who had been turned out of house and home by his landlord, fell asleep there one moonlight night, and was suddenly awakened by the sound of sweet music which seemed to come from underground.

He saw a light streaming from a doorway in the mound, and entering, crept along into a beautiful palace under the earth. Thousands of lights hung from the roof, and hundreds of pretty fairies in green coats and green gowns, with red caps on their heads and gossamer wings which reflected the lights, danced on the polished floor. As they danced they sang over and over again to the rhythm of their dance:

"Monday, Tuesday! Monday, Tuesday!
Monday, Tuesday!"

"That is a good tune," said Patsy, with a deep bow. "But it's short. Now, suppose you made it run like this:

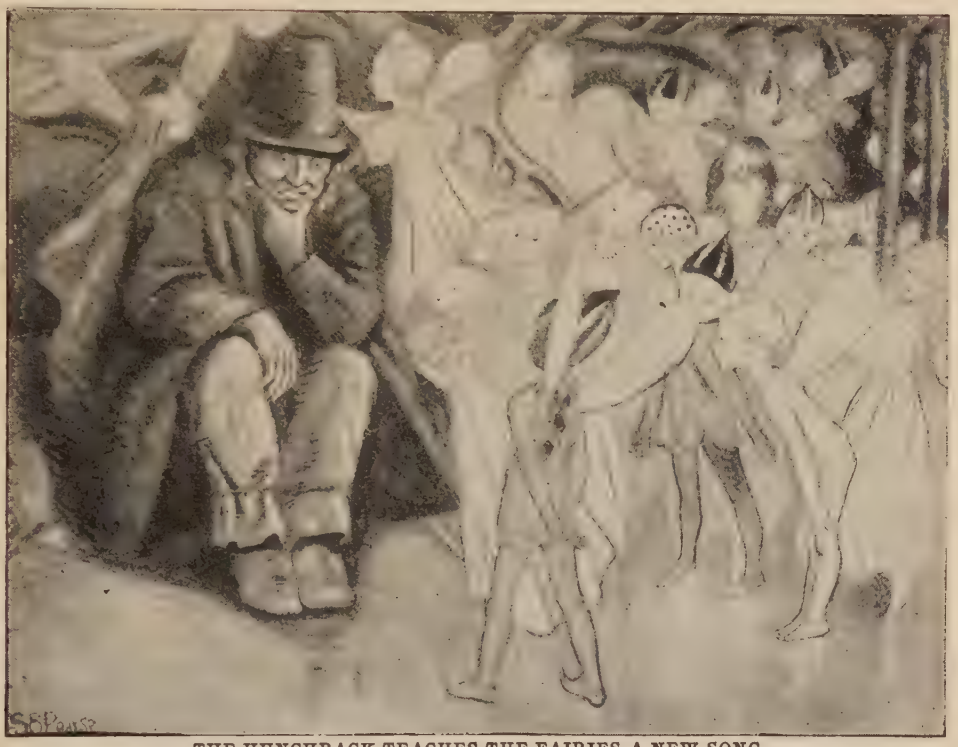
"Monday, Tuesday! Monday, Tuesday!
Monday, Tuesday, and Wednesday!
Thursday, Friday! Thursday, Friday!
Thursday, Friday, and Saturday!"

The fairies at once took it up, and made the palace ring with the new song, and their leader said to Patsy: "That is a great improvement. You have a wonderful ear for music. Now, if there is anything we can do for you, say the word and it shall be done."

"If you would kindly take the hump off my back," said Patsy, "you would make me the happiest man in Ireland."

The fairies not only took his hump away, but, guessing at his untold poverty and hard luck, they brought out a sack of gold, and Patsy filled his pockets with half of it, and left the rest.

In the morning he hurried to his landlord and paid his rent and recovered possession of his farm. He was now the happiest man in Ireland.



THE HUNCHBACK TEACHES THE FAIRIES A NEW SONG

The landlord was also a hunchback; but he was a hard, miserly man. His name was Mickey Desmond.

"You are looking well, Patsy," he said. "Where did you get your money?"

Patsy, always generous in sharing good fortune, told him about the fairy palace, and the next night Mickey went there to see if he could get something from the fairies.

As soon as the doorway opened he tramped into the palace and shouted to the dancers.

"That's nothing of a song you're singing," he said. "And you'll never get to the end of the week at that rate. Why don't you bring in all the days of the week, like this:

"Monday, Tuesday, Wednesday,
Thursday, Friday, Saturday,
And Sun-Sun-Sunday!"

Mickey, as you see, had no ear for verse or music.

But that was not the worst of it. The fairies were heathens, and nothing made them so angry as to hear anyone speak of Sunday, as that was the holy day of Christian people.

So they gathered in anger about Mickey, and their leader said in a threatening tone: "Why did you come here?"

"To get what Patsy left behind," said Mickey, thinking of the half sack of gold.

"Then you shall indeed get what Patsy left behind," said the fairy, thinking of something quite different.

Then taking Patsy's hump out of a bag, he put it on Mickey, and from that time the miserly old landlord had two humps between his shoulders instead of one; and so he was punished for his avarice by the fairies, who always recognize a man for what he is. Remember that, boys and girls!

THE WIZARD'S CASTLE IN THE AIR

A FAIRY STORY FROM SPAIN

MANY years ago, when wizards had the power of enchantment, a great wizard built a castle in Spain and hung it up between the earth and sky. Astonished at its wonder, the court and the people came out of the city to view it, and first among them all rode the beautiful Princess Isabella, the only daughter of the king. The people loved her, and there was not one of them who would not have died for her; but when, while they gazed at the work of enchantment, the wizard came and carried her off to his castle, they could only look helplessly on and wring their hands.

When the king learned of his loss, he commanded his soldiers to make great ladders and storm the castle, saying: "He who rescues my daughter shall have her for his bride."

Every able-bodied man in Spain enlisted in the army that day, and work began in good earnest.

But the soldiers could not make a ladder long enough to reach the castle. Every one over a quarter of a mile long broke as it was raised. One by one they gave up the task and went away, and at last only Diego, a little peasant lad, was left.

Diego did not know despair. Day after day he worked, practicing archery, and when he could send his arrows far and wide, and always found the mark he sought, he knew the time had come to achieve his heart's desire, and rescue the princess from her prison walls.

First he collected all his finest arrows. Then he got a quantity of string, tied hundreds of yards to his arrows, shot them deep into the oaken gate, and twisted the strands of string into a stout rope that would bear his weight. A gipsy who stood by said: "Let me help you," and so Diego asked him to watch the rope. Then he slung his bow across his shoulders, took his last and sharpest arrow between his teeth, and went up the rope, hand over hand, until far up in the deepest blue of the sky he reached the castle walls.

Now when the wizard heard the arrows strike the castle gate, he thought that someone was throwing stones against it, and in great wrath he went out to see. He was too late. Diego had already climbed the battlements and fixed his last and sharpest arrow to his bow, and as the wizard turned the corner he shot him dead.

Then the fearless youth strode into the castle, and found the princess there. He led her out, fastened the rope securely about her, and lowered her gently to the gipsy waiting down below.

But the gipsy proved unworthy of his trust. The moment that the princess reached the ground, he set fire to the rope, placed the princess on a horse, and galloped off with her to the palace. There he told a lying tale of how he had killed the wizard and rescued the princess. Diego, he said, was his servant, whom he had sent up to lower her into his arms, and he had burned the rope, and left him in the castle as its caretaker till he was ready to return there himself.

The princess felt in her heart that this was not true, but the king believed the story. The gipsy was received at court as the future sovereign, and great preparations were made for the marriage.

Meantime, however, Diego was not idle. He soon found the mechanism by which the wizard had raised and lowered the castle at his will, and the wheel with which he had steered it through the air. He quickly learned how to work the steering-gear, at once set out on his voyage to Madrid, and lowered the ponderous building to a place beside the cathedral just as the wedding procession of the gipsy and the princess approached along the street.

At sight of him, as he appeared outside the castle gate, the gipsy sprang from the carriage, took to his heels and fled. Not so the princess. She turned to her father with dignity, and said: "This is the youth who really came to my rescue and killed the wizard."

"Then," said the king bluntly, "he shall marry you."

Immediately the wedding procession moved on again with Diego as the bridegroom. He was happily married to the princess, and when the king died some few years afterward, Diego, who was much beloved, reigned in his place.

THE NEXT STORIES ARE ON PAGE 3597.

DIEGO, THE PEASANT LAD, AND THE GIPSY

One day a gipsy man came and found Diego tying yards of string to his arrows. "I'll stay and help you," said the gipsy. Diego shot arrows into the gate of the castle where the princess was shut up.

The beautiful picture of the artist's mother, by J. McNeill Whistler.

The White Girl, by Whistler.

Young Woman, by Abbott Thayer.

Harp of the Winds, mistakenly called A view on the Seine, by H. D. Martin.

PAINTING IN THE UNITED STATES

ARTISTS OF THE LATER YEARS

CONTINUED FROM 3336

WE may think of the landscapes of the Hudson River school as dry and conventional and out of fashion; but we cannot help respecting and admiring those artists, who, after all, were doing remarkably good work, judged by the standards of their time and in the light of their opportunity. Breadth and ease and freedom they had not. They did, however, give careful and enthusiastic attention to drawing and workmanship in general, and they made graceful and interesting compositions. Above all, "they had glimpses of beauty, of something which they had the taste to cultivate—if only the gods had given them the secret of painting as the true painter knows it."

The man who, more than any other, sets forth in his own career the progress of our landscape art from that time of beginnings to the present, when it has taken its place among the best of contemporary painting, is George Inness. He lived from 1825 until 1894. "His pictures vividly expose the evolution of a man of genius, proceeding step by step in the beating out of a style."

By a devoted study of nature and the poetic rendering of his own impressions of nature's quieter aspects he opened the way for other American painters who have worked in the modern way and have revealed the beauties of landscape lying close around them at home.

Born at Newburgh, New York, and intended by his father for a life in the business world, Inness turned inevitably to art. Studying for only a short time under an engraver and then under a painter, he got his most valuable knowledge of the use of his medium through his own experiment and practice. It was no outside instruction or influence that led him to select the parts of a scene that had most meaning and then to combine them into a harmonious whole, truly suggestive of a feeling in nature. With breadth and simplicity he impresses upon the scene "his own fine way of seeing it." While his earlier landscapes, like Peace and Plenty, in the Metropolitan Museum of Art, show traces of the influence of Cole and his followers, still the bigness of the canvas and the carefulness of detail are so handled as to give a single strong impression. Living far from Barbizon and its painters of the *paysage intime* in France, this American artist was yet one with them in his feelings and conceptions. Like Corot, he loved the mystical effects of morning and eve-

ning light—all of the more tender and spiritual moments of the day; and like Rousseau and Daubigny, he found his joy in interpreting these aspects of nature. And his interpretations have the beauty and the vibrancy of music. During the years he spent in his home at Montclair, New Jersey, Inness painted his most satisfying pictures. His son and pupil, George Inness, Jr., is counted among successful landscape men. In a group with Inness we must think of four others —Alexander Wyant, Homer Martin, Winslow Homer and Dwight Tryon.

The paintings of Alexander H. Wyant (1836–92) are like lyrical poems or like songs—sweet and dreamy, but true and strong. In his calm shadows and softly luminous skies, his quiet tenderness of coloring, there is subtlety of tone and vibrating beauty, yet with no lack of firmness. Trees and rocks, and the earth on which they rest, are drawn with a sure touch, and give evidence that the artist fully knew their forms and settings, their individual ways.

ALEXANDER WYANT, WHOSE LANDSCAPES ARE LIKE SONGS

As a boy living in Ohio Wyant was always drawing, although he had no chance to see good pictures until, when he was about twenty, he went to Cincinnati. That city already had collections that offered satisfaction to the art-thirsty. Among the paintings that the youth saw there, a landscape by Inness awoke in him almost an adoration. Traveling to New York, he went to ask advice of the master, and, encouraged by the kindly criticism he received, went on to study in Europe. But, having gained a start in technical knowledge, he returned to work out in his own way a method of expressing what he felt. To earn money he joined a government party on a trip of exploration in the West, where hardship broke down his health, leaving him partly paralyzed. Placed in a train to go home to Ohio, he courageously kept on the way until he reached New York, determined not to give up painting. Though he partly regained his health, he had thereafter to paint with his left hand and to save up his strength for his beloved work, always counting the time too short to accomplish what he longed to do. For a while his summer painting was done in the Adirondacks, later in the Catskills. His landscapes are examples of sound painting.

Another poet-painter of landscapes that impart a personal message is Homer D. Martin (1836–97). Self-taught and big-natured, full of jollity as a man, full of deep seriousness as a painter, Martin found in nature the things that are essential and forever true. These are the qualities that we feel in his pictures, where the skies vibrate with the light that comes from great depths of distance, and where the landscape is usually modeled in masses. "In his masterpieces there is the evidence of a great mind, for the time being unreservedly consecrated to great ends."

HOMER MARTIN, A PAINTER WHO SAW NATURE IN MASSES

Martin, who was born at Albany, New York, had only a few lessons in painting from William Hart. Because of a weakness of his eyes he saw nature in masses, missing all sharp outlines. For a long time he distrusted his own impressions because of this defect. At the age of forty he went to Europe, visiting Holland, England and France; and in 1881, after a short stay in England, he spent nineteen happy months in a little village of Normandy. There he stored up impressions that later took form in such pictures as Normandy Trees, Old Church in Normandy, and the familiar composition wrongly known as a View on the Seine. One of his best landscapes is Westchester Hills. This was the only one painted entirely out of doors, as Martin, like Corot, usually absorbed his impressions at his ease when out of doors, making notes from which he could reconstruct the scene later in the studio whenever he felt the irresistible impulse to paint. While in the presence of nature he seemed to become one with nature's self.

It is said that the director of the Luxembourg Museum in Paris, when he was looking about among the American paintings in the Metropolitan Museum of Art during a visit, stopped short before a group of Winslow Homer's sea pictures. "Ah! *that*," he exclaimed emphatically, "is an American."

It is generally agreed that Winslow Homer (1836–1910) was "the most intensely American painter of his time," painting American themes because his whole nature was in tune with them, and because he found his greatest satisfaction in giving them expression. Whatever he painted, we feel that it interested him

and aroused his sincere emotion. One critic speaks of "the simple vitality of his art, its fidelity to nature, the wonderful way in which it takes us away from ideas of paint and the like, and makes us rejoice in the salt winds of the sea, the loveliness of sky and water, the fundamental charm of human nature bearing itself bravely and effectively in the face of the elements."

But Homer was well over forty years old before he turned "his inspired attention to the sea," painting his unforgettable pictures of the Maine Coast and its heroic fisher folk.

WINSLOW HOMER'S STIRRING VIEWS OF FISHER FOLK AND THE SEA

The boy Winslow Homer grew up in Cambridge, Massachusetts. As he went upon his way fishing and studying and playing he noticed the forms of nature and made careful drawings of what he saw. After two years in a lithographer's shop, as a young man, followed by a little time in a Boston studio, he decided to be independent and work in his own way. Then, when the Civil War began, he became a member of the Army of the Potomac. From the front he sent to Harper's Weekly drawings of incidents in camp life. Out of these developed paintings of some of the incidents, two of which, Prisoners from the Front and A Rainy Day in Camp, can be seen in the Metropolitan Museum of Art.

Pictures of negroes and country life in the South followed. Then, at last, Homer found the theme that was to be distinctly his own—the ocean, first as a background for the figures of human beings in dangerous and dramatic moments, later as itself the principal motive. As a painter of marines (sea pictures) he has had no equal in America. Of his earlier sea pictures, The Life Line, Eight Bells, and All's Well are familiar examples; of the later ones, the Maine Coast and the Northeaster.

In water color the painter had great skill, using that medium with especial ease and delicacy. As early as 1866 he had part in organizing the American Water Color Society.

In Dwight W. Tryon (1849–1925) New England has had a painter who with understanding sympathy and poetic vision could put upon canvas the very look and atmosphere of her countryside. Born at Hartford, Connecticut, he grew up loving nature and gathering an intimate knowledge of it. "The spirit of the landscape stole into his heart when a boy, and abided with him in his manhood." He had become a man and had married before he was able to gather together enough money to go to Paris to study painting. He and his wife made a home for themselves there while he worked under Daubigny and others.

But beyond the strengthening of his already vigorous art and a gain in technical skill and knowledge he was not changed by the foreign influence. He still worked to solve in his own way the problem of painting the features of his native landscape. For, just as one face differs from another, each part of the country has individual traits by which those who know it can recognize it. In Tyron's landscapes we feel the strength and sometimes the sternness, as well as the delicacy and refinement, of New England—its softened light and tender atmosphere. For, no matter how simple and commonplace the subject may be, he not only truthfully portrays the actual scene, but presents it with poetic suggestion, the result of his own loving association. Nor is there any lack of skill. On the contrary, his technique has the admiration of other painters, who alone can really appreciate its fineness. Early Spring, The Rising Moon, Winter Evening, and After Showers—June, are the names of some of his pictures.

AMERICAN PAINTERS WHO LIVED AND WORKED ABROAD

Some American painters who went abroad to study chose to spend most of their lives in Europe and have been claimed by the lands in which they lived. But they are truly American, not only through the accidents of birth or parentage, but by virtue of characteristics that mark them and distinguish their work. The "basic quality"—the quality underlying all else—in each of them is essentially American.

James A. McNeill Whistler (1834–1903) was born at Lowell, Massachusetts. The son of an able engineer and army officer, young Whistler went to West Point, intending to enter the army, but before long he left to go to Paris, where he studied painting. His sensitive response to the various influences of world art resulted in a style which mingled them all and yet was a distinct expression of his

own personality. In Velasquez he found power of line and a masterly use of blacks and grays. Rossetti and the other Pre-Raphaelites impressed him with their poetic seriousness, their spirituality of feeling. Courbet and the impressionists helped on his naturally delicate perceptions of light and color values. And in the work of the Japanese artists he found a fascinating example of variety and skill in the making of pattern or design, of choosing an unusual point of view, of producing harmonies of tone. In them, too, he found something else which fitted happily into his own way of thinking—the use of form as a symbol to represent what is formless and spiritual. Delicately he selected what he found good in different schools and influences, putting all at the service of his exquisite feeling for beauty and his desire to give this feeling beautiful expression.

WHISTLER'S PAINTING, A PERSONAL AND UNIQUE EXPRESSION

And so we have the record, not of the facts he met, but of his feeling about the facts. His portrait of his mother, in the Luxembourg, Paris, is more than the portrait of one charming elderly woman. It embodies his own devotion to his mother, his thought of the motherhood in her, and so becomes a symbol of universal motherhood. Of his other portraits the most noteworthy are that of Thomas Carlyle, in Glasgow, that of the violinist Sarasate, in Pittsburgh, and the charming little Miss Alexander, in London.

His figure-painting is more elusive in its charm than are the portraits, as may be perceived in The Music Room, The Balcony, and At the Piano. In these we see a rare originality of design. But in his "Nocturnes" and his etchings the originality of his creative genius found fullest play. The former are patterns or harmonies in color that express the artist's sense of some beautiful moments in nature. They are altogether personal and unique, and can best be studied in the Freer Gallery in Washington. As an etcher Whistler has no peer from the days of Rembrandt. He lived in London from the year 1859 until his death. Of his eccentric ways and his egotism you will often hear, but these are peculiarities of the man rather than of the artist.

Another artist who shows remarkable originality of thought and creative faculty is Elihu Vedder (1836–1923). Born in New York, he studied at home and in Paris before going to Italy in 1857. Back in the United States during the years of the Civil War, he could not be admitted to the army because of a defective arm. Before he returned to Europe he was elected to the American Academy of Design. Settling in Rome in 1867, he made his home there for the rest of his life, but frequently visited his native land.

Illustrations for Omar Khayyám, designed in 1884, brought him wide recognition. His intellectual force and imagination—his poet's mind—supported by great skill in draftsmanship, give him a place apart. Figures and color he used with symbolic force instead of realistic truthfulness, and a landscape surrounding his figures he could fill with dramatic meaning. His pictures have literary interest, beauty of idea, as well as charm of design. This you could guess from some of their titles: The Cumæan Sibyl, The Fisherman and the Djinn, The Pleiades, The Keeper of the Threshold. Among his mural decorations are five panels and a mosaic in the Congressional Library at Washington.

Of unusual interest is the career of Mary Cassatt, "painter of children and mothers." A member of a Pennsylvania family, she went to Europe as a girl to study painting; and in 1874, after learning from some of the old masters in galleries of Italy, Spain and Antwerp, she settled in Paris. Always independent in spirit, she joined with great enthusiasm the French impressionist group in their protest against convention in art. It was Degas who invited her into the ranks, and his work and that of Manet influenced her style, although she has always painted in her own vigorous way, never losing her individuality. Paris continued to be her home, but she emphasized her desire to be counted an American.

ABBEY'S GIFT OF TRANSLATING ROMANCE FROM WORDS INTO FORM

Edwin A. Abbey (1852–1911), a native of Philadelphia, like Vedder, first won fame as an illustrator, and, like him, continued to choose literary themes for his pictures. After studying at the Pennsylvania Academy, Abbey became a draftsman for Harper & Brothers, publishers, in New York. His skill and his gift of original expression brought him early success, the first general recognition of

which came when his illustrations for Herrick's Poems were published in 1882. To get a true feeling for the setting and atmosphere of these illustrations the artist had gone to England to catch the spirit of the countryside. There he found exactly the conditions that suited him, so there he chose to make his home from that time until his death.

Successful in water-color painting, pastel and oil, as he had been in pen-and-ink drawing, Abbey became closely associated with the art life of England, and in 1898 was made a member of the Royal Academy. In 1901 he was chosen as the artist to paint the picture of the coronation of King Edward VII. He was the third Pennsylvanian to receive such recognition, since Benjamin West had painted a similar scene for King George III, and Charles Robert Leslie one for Queen Victoria.

But we usually think of Abbey's art as presenting in form and color romantic events that had their beginnings in the minds of poets and other authors or in the old legends of the world. Some of his pictures, for instance, are founded upon Shakespeare's plays. Such is the scene between King Lear and his daughters, which you may see in the Metropolitan Museum of Art.

Although he had the power of "seeing" what never had actually existed, and of picturing or re-creating truly and convincingly scenes that he caught by that power from word-descriptions, Edwin Abbey was the most earnest and caretaking student. He examined all the sources he could reach, and even traveled far to get exact knowledge of places, buildings, costumes and other details to be used in his historical paintings.

There is an interesting story of the trouble he had once in persuading the mayor of a little town in France to let him copy some pillars that were just what he wished for his picture of Sir Galahad's Vision of the Holy Grail. This is one of the panels in his series "The Quest of the Holy Grail," on the walls of the Boston Public Library.

In addition to these famous mural paintings he made another series for the Capitol at Harrisburg, in his native state. He put into these his love for, and loyalty to, Pennsylvania and its history, working on them for the last ten years of his life. In noble groups and symbolic figures he has done honor to his state and his country, and at the same time has most successfully filled the spaces granted him in the architectural plan, adding the right play of color and fine decorative design. Death came before all the paintings planned for the building had been completed.

Abbey presents his figures in masses softened by effects of light and atmosphere, and his composition shows a balancing of color masses.

Sargent, a Gifted, Successful and Industrious Artist

A friend of Abbey, another American painter who spent most of his life in Europe and received high honors there, is John Singer Sargent (1856–1925). His is not a story of hardship and struggle, for the conditions of his life were fortunate, and success flooded upon him from his first appearance in the world of painting. Nor is his story one of idle yielding to fortune or of reveling in success. He thought of painting as his special work, as well as his finest satisfaction, and he painted eagerly, conscientiously and industriously all the years of his life.

Sargent's father was a man of culture and a member of an old New England family. He and his wife were living in Florence, Italy, when their son was born; and in that city, where the whole atmosphere breathes of romance and beauty, where art is utterly at home, the boy grew up. His family life and his education developed in his nature breadth of thought and taste. Under his mother's direction his artistic training began.

At the age of eighteen he went, with a bundle of sketches, to Carolus-Duran in Paris and became his pupil—a pupil who in four years exhibited in the Salon and a year later painted a portrait of the master, surpassing the master's own skill. Thus early John Sargent reached maturity in art. Some years later he was given the title of "the only living old master," for long before his death some of his portraits were hung in the British National Gallery, where before that time no work by a living artist had been hung, and his pictures were being gathered into both public and private collections in company with those of Velasquez, Titian, Rembrandt and Hals.

All these masters and others had contributed to the success of this follower of their art. By studying their works he

took into himself something of their knowledge and skill in the control of paint, just as he had taken over from his living French master the qualities that he had to give—especially an understanding of the action of light upon color and outlines. Yet Sargent never lost or dimmed his own quality. Various influences entered into it and became part of it, but his method and his style were his own, based upon the American temperament which was his heritage.

The most famous of nineteenth-century portrait-painters

From 1884 he made London his home, with frequent excursions into the country and many visits to the United States, of which land he always claimed himself to be a citizen. In 1897 he was given membership in the Royal Academy at London and in the National Academy of Design. Hosts of Europeans and Americans, both distinguished and unimportant, had their portraits painted by Sargent—far the most famous painter of his time. Opinions about those portraits vary. We may claim that in general his first interest is that of a maker of pictures rather than that of a portraitist, that he cared more for the type than for the individual. Yet some of the portraits, like that of Mr. Marquand, show a truly sympathetic understanding of the subject. His paintings of children are exquisite in their delicacy and tenderness. One, called Carnation Lily, Lily Rose, is a lovely composition of two little girls hanging up lanterns in a garden.

Landscapes, pictures giving glimpses of life in various lands, and some admirable water-colors came from the unwearying brush of this painter; nor are they inferior to the portraits. Some rate them higher as more expressive of the man himself.

Much of Sargent's time in his later life was given to painting the familiar mural decorations for the Boston Public Library and others for the Widener Museum of Harvard and for the Boston Museum of Fine Arts. It is pleasant to think of him and Abbey working side by side in one studio on their great decorative designs for the Boston Library.

The story of mural painting in America has not gone far beyond a beginning as yet, and few of the artists who have contributed to it were trained specifically for that kind of work. We have seen how La Farge adapted himself to it, and how Abbey and Vedder and Sargent were called upon to turn their gifts to that use. We shall briefly review several others who have become noted for wall-decorations in public buildings and private residences in the United States.

The interesting beginnings of mural painting in America

An event which did more than anything else to awaken enthusiasm for beautifying the centres of life and industry was the World's Columbian Fair at Chicago in 1893. The "White City" created there by architects, landscape-designers, sculptors and painters, all working together for one fine and inspiring result, was an object lesson for the whole nation. And at the same time it was, we may say, the opening of the school of mural decoration in the country.

The director of decorations and functions was Francis D. Millet (1846–1912), a man who generously gave himself to many executive works, yet found time to paint highly finished genre pictures and carefully studied decorations for public buildings in Baltimore, Jersey City, Cleveland, St. Paul and other cities. In technical matters he never accepted the newer ideas of impressionism, but remained true to the earlier way of painting. He was deeply missed when he was drowned in the sinking of the steamer Titanic.

The wall-paintings of the Library of Congress in Washington, opened in 1897, were done by various artists who found there a second great opportunity to work out this new problem.

John W. Alexander (1856–1915), who had studied in Europe with Duveneck, you remember, painted portraits of many noted persons, among them that of Walt Whitman on page 4729, and was equally well known for his figure-studies of gracefully posed young women. But he added to these and to his landscapes a series of pictures, "The Evolution of the Book," for the Library at Washington, and another admirable series of many panels for the entrance hall to the Art Museum of the Carnegie Institute at Pittsburgh. His method of painting is modern and effective.

Kenyon Cox (1856–1919) was a devoted follower of the academic idea, remarkably skilled in draftsmanship and the planning of handsome decorative de-

sign, but less effective as a colorist. His great gift for drawing and his rich store of thought and imagination made for him a high place among illustrators before the Chicago Fair gave him his initiation into mural painting. In the Library of Congress his panels present the Arts and Sciences in formal figures of women bearing symbols; and he is represented, besides, by decorations in Des Moines, Iowa, in the State Capitol of Minnesota, in Wilkes-Barre, Pennsylvania, and in other parts of the United States.

The year of the World's Fair (1892–93) is a milestone in the career of Edwin H. Blashfield, born in New York in 1848. Until then he was known as a painter of genre and figure subjects; since, he has become a leader in the ranks of mural painters. The cupola of the Liberal Arts Building at the Chicago Exposition was decorated by his brush; and the dome of the Library of Congress is an example of his ability to make a composition which fits harmoniously into the design and structure planned by the architect. State capitols, in Minnesota, Wisconsin and Iowa, with buildings, public and private, in Baltimore, Pittsburgh, New York and elsewhere, hold evidence of his taste and sincerity, his love of beauty and knowledge of his art.

Some of the same buildings—the Washington Library and the Minnesota Capitol—besides the State House at Boston, the capitols of South Dakota and Iowa, with other edifices scattered about the country—have been beautified by the work of Edward E. Simmons, who also dates his advance in this field from 1893. Charm of color and freedom of style are qualities that distinguish him.

And so we might go on, had we space, to tell of Robert Reid, Will H. Low, Robert Blum, Charles Yardley Turner, Violet Oakley, Albert Herter and other mural painters who have thus been bringing new beauties into many lives.

Figure-Painting Offers Room for Many Styles and Interests

In the United States, landscape holds the first place, but close beside it stands figure-painting, a province to which American artists have brought a great diversity of styles and interests.

Bridging the gap between the first quarter of the nineteenth century and the opening of the twentieth, Eastman Johnson (1824–1906) painted better genre pictures than had been made before by an American. After studying at Düsseldorf he spent several years in Holland, where, you remember, genre painting reached an excellence that has never been outdone. His own genre studies—Old Kentucky Home, Corn Husking at Nantucket, and others, all very popular thirty or forty years ago—have an air of great naturalness and are painted in a broader way than are his portraits. One of the best of the portraits, which preserve the features of John Quincy Adams, Longfellow, Emerson and other noted Americans, is the interesting group, Two Men, in the Metropolitan Museum of Art.

Thomas Eakins (1844–1916), in spite of academic French training, was a realist and a naturalist in manner, willing to sacrifice grace or picturesque quality to a stern, direct statement of fact. Life and character were the things that interested him above all else. So, whether he painted a portrait or a figure-study, he aimed at presenting an actual record of life. He made one painting of a man that has become increasingly famous. It is called The Thinker, and it seems to set before one's eyes the very performance of a mental act. Feet apart, hands thrust deep in pockets, the man stands in an unconsciously awkward pose—his whole attitude as well as his face showing him to be lost in thought.

For strength and sincerity and knowledge of drawing, well; but for the charm of color and realization of beauty Eakins seems to have had little capacity.

George de Forest Brush and Abbott Thayer, Idealists

Two friends who were young men together in Paris in the 1870's, and who continued their friendship through life, are alike in the high idealism and sincere performance of their art, but very different in their manner of painting and in the distinguished types that they created. They are George de Forest Brush, a native of Tennessee, and Abbott Thayer, who was born in Boston but is closely associated with New Hampshire.

The former, while true to the teachings of the great masters of painting, and keeping to the older traditions of color rather than to the new feeling for outdoor, luminous effects, shows originality of mind in making use of his knowledge. His work reflects the Dutch and Italian schools, but does not copy or imitate.

His earlier canvases have for their prevailing theme the life of the Indian, a theme which reaches noble and unusual distinction in his handling. There is quiet dignity in his fine figures set, as a rule, in landscape that seems to live. The Silence Broken, The Indian and the Lily, and Mourning her Brave, are examples of this phase of his work. They are "picture-poems," which take their place beside Longfellow's Hiawatha in making real for us the primitive life of the country. Equally his own are the groups of mother and children which hold a note of calm, serene beauty, serious almost to sadness. There is entire simplicity in the pose and in the folds of the garments. In most of these groups, notably the earlier ones, the color is subdued in key, but warm and mellow. Mastery of drawing and a beautiful dignity of composition mark all of Brush's works.

A LOVER OF NATURE WHO FOUND OUT ONE OF HER LAWS

The memory of Abbott Thayer (1849–1921), "a remarkable spirit and a remarkable painter," shines with the radiance of a personality that impressed all who knew him and that found expression in pictures glowing with vital beauty. There is something almost Greek in the firm, serious, dignified beauty of his figures of goddess-like women—a beauty uplifted and spiritual, but strong, not too delicate for this earth, even when the forms are winged. Their eyes have the light of far visions, but their feet firmly tread upon the ground. In Caritas (Charity) a tall, stately woman seems to protect and bless two small children beside her. In another picture, The Virgin, a lovely girl moves lightly and easily, but steadily, forward leading a child with each hand. Thayer's landscapes show the same understanding and earnest enthusiasm. He loved all beauty and he intimately knew nature.

It was through this knowledge that he was able to explain nature's secret of protective coloring and its relation to the play of light and shade; and by applying the rules he had worked out, now known as Thayer's law, he developed the art of camouflage in the World War.

Very different from the women of Brush and of Thayer are the women on the canvases of Thomas Dewing. His have an ethereal but worldly beauty, while theirs were firmly modeled, yet filled with the light of spiritual beauty. The delicate and subtle creative art of Dewing has made a world of refinement and charm where fair women with grace and composure fit into elegant interiors or dream-like landscapes. There is no movement, no agitation. His color-schemes are subtly modulated harmonies.

GEORGE BELLOWS, WHOSE STROKE PUT LIFE ON THE CANVAS

When the sudden death of George Bellows was announced in 1925 the shock was such as you would feel if you saw a strong runner drop in the middle of a race. At the age of forty-two—an age when many an artist is only beginning to get recognition—this sturdy independent painter, who had always gone his own way, making no efforts for public approval or popularity, had become a figure to be reckoned with in the art of the world.

Before he was thirty he was made an Associate of the National Academy of Design (the youngest painter ever recognized in this way) and had had a picture placed in the Metropolitan Museum of Art. As he never was in Europe, such influence as he felt from works of the world's master painters came to him in American galleries. Holding to his own course in the midst of swirling modern art movements, he painted with zest and with power all manner of things that came into the path of his daily life in New York—the landscape along the Hudson, spring in a city park, a prize fight, a crowd of city boys playing and diving from a board beside the river, kindly old ladies, and again and again his own family household—his wife and his two little girls. To every theme he gave a bold vitality, a touch that made it live, whether he did it in color or in the blacks and grays of the lithograph. His own vigor and enjoyment seemed to flow through his brush into his work.

As a lithographer he is ranked among the masters of the art, and his prints are eagerly sought. What he might have accomplished had he lived longer we shall always wonder. He is rated without question the most "native" American painter—even more notably so than Winslow Homer.

When Bellows arrived in New York, fresh from college in his native Ohio, the strongest influence that touched him was that of his teacher, Robert Henri, who

continued to be his friend. Henri has been a leading figure among the independent painters of our time, affected by the influence of the French moderns, Manet and Degas, and by Japanese art. His brush is gifted and his style easy and spirited. He and William Glackens, together with George Luks and W. J. Sloan, have for their first purpose to present reality of life, gathering up essential qualities and setting them forth in a broad fashion. Details are sunk beneath the all-important general impression.

Charles W. Hawthorne, working with the same object of portraying the real and the same interest in skillful, broad painting, reaches something deeper because of an interest in his subjects as human beings.

MANY VARIETIES OF SUBJECTS AND STYLE IN FIGURE-PAINTING

Another painter who shows healthy and sincere sympathy with the persons he paints—usually young men, women and children of the Dutch peasantry—is Gari Melchers. An independent in style, he is modern in method, but does not turn in the direction of extreme impressionism. To him details seem necessary for the presentation of the truth. He has some of the qualities of Flemish painting. His manner is direct; his style vigorous and fresh; his color and design, of decorative value.

E. Irving Couse has made interesting studies of the life and pursuits of the Taos Pueblo Indians. Frank W. Benson, known also for his etching, has painted charming figures of women and children in brightly sun-lighted scenes. Frederick C. Friesecke and Richard Miller are concerned almost exclusively with the conquest of light and color, so that their figures can be considered hardly more than studies in color. Another phase of the modern study of light, or lighted atmosphere, can be seen in the figure-paintings in interior settings, by Edmund C. Tarbell and William M. Paxton.

Most of these painters of figures are portraitists as well; and among them, excelling in both fields, stands Cecilia Beaux. With free brushwork and fine sense of values she depicts particularly well women and girls in natural poses. Her pictures are distinguished by a delicate grace and delightful elegance.

Of a very different type, but also graceful and beautiful, are the figures by Lilian Genth set against idyllic green out-of-door backgrounds.

In Arthur B. Davies we find a painter who uses figures and landscapes chiefly to symbolize ideas or express feeling, but never loses the sense of their value as parts of a decorative scheme. His art claims for its example the simplicity and flatness of the Italian primitives. His paintings suggest mystery and romance—a world of dreams, but one founded upon a knowledge of the real world.

HOW LANDSCAPES REVEAL THE MINDS OF THEIR PAINTERS

Some painters have done almost equally good work in figures and landscapes. For example, J. Alden Weir, 1852–1919, not only experimented but found success in different sorts of painting. Impressionist in style, he felt the subtle gradations of light and tone, and presents the actual appearance of a landscape, a figure or a group with the understanding of a man of fine perceptions. He painted some charming pictures of his children with their pets, one of which is called The Donkey Ride.

William Gedney Bunce (1843–1916) was held by the fascination of painting Venice; while William Sartain (1843–1924), genre and landscape painter, is known chiefly through his scenes of Algeria and the life of its people. On the other hand, their contemporary Ralph Blakelock (1847–1919), an artist with no training beyond what he gained from experience, summoned out of nowhere, as if by magic, a land of his own creating. The actual shapes of things did not count so much as his imaginative vision of them. While his tone is often heavy and his paint thickly spread, he could at times get most delicate shades of tone. Sunset and moonlight scenes and Indian encampments in the forest are some of his themes.

In the pictures of Albert Ryder (1847–1917) it is again the imaginative thought, the poet feeling, that we care for. These overbalance a lack of accuracy in form and faults of color-handling. The atmosphere of beauty clings around the scene, whether the theme be taken from a homely stable incident or lifted to a lofty dramatic or religious plane. Mending the Harness, Siegfried and the Rhine Maidens, and Pegasus are some of his suggestive subjects.

In distinct contrast with such canvases

let us think of the fresh, joyously painted "portraits of landscapes" made by Willard Metcalf (1858–1925)—sometimes intimate bits of nature, sometimes broader sweeps. Here skill of workmanship and a fine sense of design are added to beauty of color. Nor is this all. There is a vitality—a feeling of air and of sunshine, or perhaps of the silence of night—that comes from the artist's own attitude.

Francis Murphy (1853–1921), while he caught the true atmosphere of certain phases of nature and made fine records of tree life in his tender-hued landscapes, was more limited in theme and mood.

Differences between earlier and more modern aims

Metcalf belonged to that group of men who came from Paris bringing the first impulse of the plein-air movement—the practice of studying the effects of light on nature in the open air. As we know, all painting from that time has been affected in some fashion by this new way of looking at nature. In general we may say that the later work is less concerned with pictorial effects—the making of graceful pictures—than was the older. It aims more at giving an impression of the very appearance of things—their aspect; or its first object may be to make a beautiful and interesting decorative effect.

John H. Twachtman (1853–1902) in his experience spanned the two ideals, for he laid strong foundations as a student under Duveneck and then at Munich. Yet no other has left canvases that have more exquisitely caught an expression of nature's essential abstract meaning—that elusive, charming "spirit of place." He discloses it equally in the opalescent shimmer of a snowy landscape or the broad-spread beauty of his farm in the summer time.

His later methods were the modern methods of France, and while methods alone cannot make painting live, they count largely toward the desired results. Childe Hassam, using Monet's way of painting to produce color pure and vibrant—color infused with light—seems to imagine in color. Best of all, among the varied themes he has chosen, shine his vivid coast scenes; but through all his work we feel his love of beauty and the sense of his joy in painting.

In such brief space as we have it would be vain to try to do justice to the many painters not already included here but holding an important place in the development of the American art story. Nor can we make a satisfactory grouping of them. So, although lists are seldom either interesting or profitable, we shall set down here names that you will be sure to find in the catalogues of museums and exhibitions.

Some things to keep in mind when looking at pictures

At any time when you may have an opportunity to see work by these artists or reproductions of their pictures, look at them with a thought of discovering what they are meant to express and how the painter has made his effects. Some are realistic studies of facts; some have their realism touched with imagination; a few are idyllic. Some methods you will recognize and name; some will be plainly independent.

Here, then, is the list, beginning with two men who make broad and beautiful pictures of rocks and ocean: Paul Daugherty and Frederick J. Waugh; and a painter of open desert spaces: Albert L. Groll. We set down the rest, regretting that they must be without comment: Edward Gay, Charlotte Coman, Charles H. Davis, Arthur Parton, Henry W. Ranger, Charles Melville Dewey, William A. Coffin, Ben Foster, Leonard Ochtman, Bruce Crane, Birge Harrison, Emil Carlsen, W. Granville-Smith, Elliott Daingerfield, William L. Lathrop, Henry Golden Dearth, Louis Paul Dessar, Henry Watrous, Irving R. Wiles, Sergeant Kendall, Charles C. Curran, Edward W. Redfield, Gardner Symons, W. Elmer Schofield, Max Bohm, Hobart Nichols, Ernest Lawson, Robert David Gauley, Frederick Ballard Williams, F. Luis Mora, Wayman Adams, William S. Robinson, Daniel Garber, Rockwell Kent. Yet the story is not fully told. Time will add many pages.

We may, and we should, among the treasures of art, choose the things that are most to our taste. But let us take pains to keep our taste fine, and let us try to find in each work the artist's own purpose and feeling.

"An artist's style may be intimate or commanding, he may deal in broad brushstrokes or effects of miniature; the first and last requisite is that he do a beautiful thing and reveal himself in doing it."

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 3699.

PAINTINGS BY AMERICAN ARTISTS

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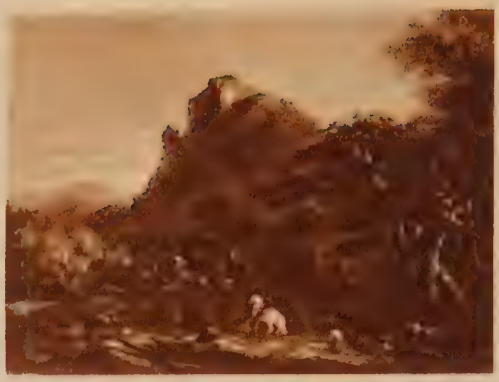

THE MOUNTAIN FORD, BY THOMAS COLE,
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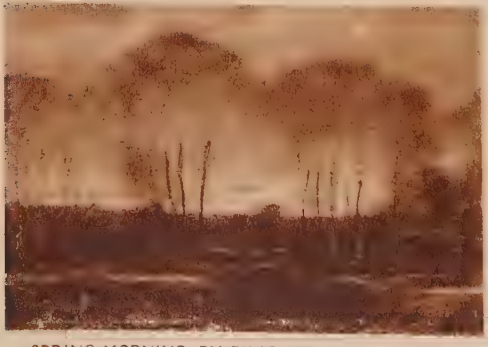
BRINGING HOME THE CATTLE, BY THOMAS MORAN, IN THE ALBRIGHT ART GALLERY



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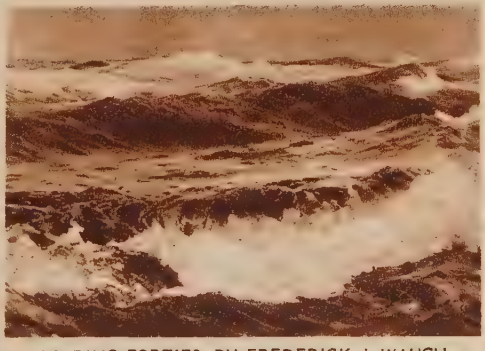

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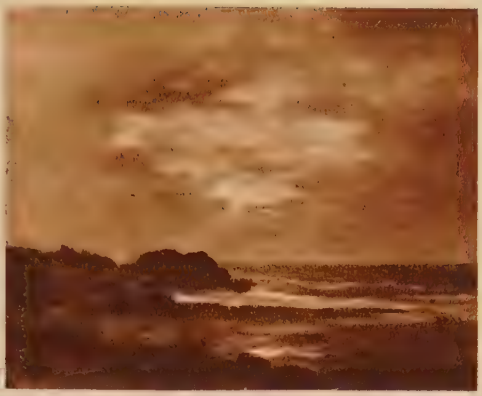

COAST-SCENE, BY GEORGE INNESS

PEACE AND PLENTY, BY GEORGE INNESS, 1865, IN THE METROPOLITAN MUSEUM OF ART

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MOTHER FEEDING HER CHILD, BY MARY CASSATT

THE EVENING MEAL, BY MAX BOHM

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A GIRL'S DESPERATE RIDE

CONTINUED FROM 3068

SIR JOHN COCHRANE had been condemned to die, and was shut up in the Tolbooth prison in Edinburgh, seen in the picture. He wished his sons and his daughter to refrain from visiting him, for he had joined in Argyle's insurrection against the new king, James II, and thought that if his children came to see him they might lay themselves open to suspicion. But one day he had a visit from his daughter Grizel.

Father and daughter felt very sad indeed, for only one glimmer of light could they see. Sir John's father had written an appeal for pardon to the king's confessor, who had great influence over the monarch. But time was pressing. The journey to London took days to perform, and if the pardon did not come soon, Sir John must die. Even then the warrant must be on its way to Edinburgh.

While discussing the desperate situation, Grizel had an idea which she decided to act upon at once.

Early on the next day she rode south. First, she called at the cottage of her old nurse, borrowed her foster-brother's clothes, and then rode on to meet the messenger. She discovered the inn where he was staying and entered the room where the man lay asleep, exhausted by his journey. But he was lying on the mail-bag, and she dared not attempt to draw it away. So she quietly took the charges from his pistols, mounted her horse and rode a short distance, then halted and waited for the messenger.

When the man rode up, she was ready for him. She greeted him pleasantly, and rode alongside and chatted with him. Then, sure of her ground, she quietly told him that she must have his bag. The man at first thought the youth, as she appeared to be, was joking; but he grew angry at her persistence, and when she aimed her pistol at him, fired his at her. But, to his surprise, it failed to go off, and his second pistol proved equally useless.

Wild with rage he dismounted and rushed at his assailant, but the girl, quick as lightning, seized his horse and galloped away with it; for was not the precious mail-bag attached to the saddle? Furiously she rode until she reached a wood, where she opened the bag, and took out the warrant. Then after changing her clothing she rode back to Edinburgh.

The non-delivery of the death-warrant caused a delay which allowed time for the king to consider a bribe from Sir John's father. This he accepted, and so Sir John was saved.

THE BRAVE CARDINAL OF MILAN

THERE is a terrible sickness which from time to time breaks out in the East. It is called the plague, and is a typhoid fever exceedingly violent and rapid, accompanied by frightful pain and suffering and usually ending in death. Some people suppose that it is caused by the marshy, unwholesome state of Egypt after the waters of the Nile have gone down, and it generally lingers, in Egypt and Syria, until its course is checked by the cold of winter.

At times this disease has become unusually infectious, and then it has gone beyond its usual boundaries and made its way across the West. Two hundred years and more ago these dreadful outbreaks were rendered more frequent owing to the fact that people lived very dirty and unhealthy lives, being crowded together inside the walls of a town, and not being able in times of war to live outside the fortifications. The plague often followed war, and swept away many poor creatures who had been weakened by previous want.

The desolation of a plague-stricken city was a sort of horrible dream. Every infected house was marked with a red cross, and carefully closed against everyone. The bodies of the dead were thrown into large trenches, without prayer or funeral rites, and these were hastily closed up. Whole families died together, untended save by one another, with no aid from without. The last chances of life were lost through want of drink or food.

Such disasters as these did indeed prove whether the pastors of the afflicted flock

THE COLOSSAL STATUE OF CARLO BORROMEO STANDING IN A PARK AT ARONA, ITALY

Contrary to the Cardinal's best wishes a memorial was erected to him in Milan Cathedral, as well as a statue seventy feet high on the hill above the town of Arona where he was born. Thence the great figure looks out over Lake Maggiore. Because of its size and hollowness people can climb up inside it and stand within the head! The statue has stood there for more than two hundred years.

were shepherds or hirelings. So, in the year 1576, thought Cardinal Carlo Borromeo, Archbishop of Milan, when he heard at Lodi that the plague had made its appearance in his city. He used to preach in that beautiful building rising above the great city of Milan, which is pictured below, on this page.

Now, as it happened remarkably enough, in this very city there had lately been such wickedness that he had solemnly warned the people that, unless they repented, they would certainly bring down on themselves the wrath of God. His council of clergy advised him to remain in some healthy part of the country till the sickness was over, but he replied: "The duty of a bishop is to give his life for his sheep, and I cannot rightly abandon them in this time of peril."

The council agreed that to stand by to comfort and help the afflicted was the higher course.

"Well," said he, "is it not a bishop's duty to choose the higher course?"

So back into the town of deadly sickness he went, leading the people to repent, watching over them in their sufferings, visiting the hospitals, and by his own example encouraging his clergy in carrying spiritual consolation to the dying. All the time the plague lasted—four months—his exertions were fearless and unwearied. Remarkable as it may seem, of his whole household only two died, and they were two who had not been called to go about visiting the sick.

Indeed, some of the rich who had repaired to a beautiful villa, where they spent their time in feasting and amusement, were even there attacked by the pestilence. They all perished, their dainty fare and their grandeur having no doubt been as bad a preparation for sickness as the poverty of the starving people in the city, whereas the strict and regular life of the cardinal and his clergy and their home in the spacious and airy palace no doubt preserved them from the plague.

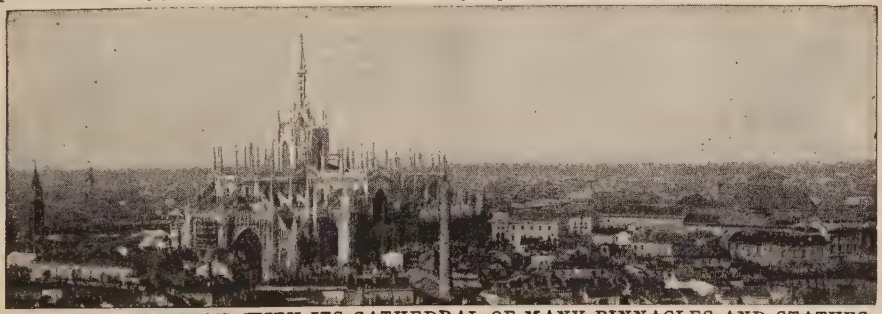
In the opinion of his own time, however, there was little short of a miracle in the safety of one who daily preached in the cathedral, bent over the beds of the sick, giving them food and medicine, and administering the last rites of the Church, and who then braved the contagion after death rather than let the corpses go forth unblest to their common grave.

Nay, so very far was he from seeking to save his own life that, kneeling one day before the altar in the beautiful cathedral, he solemnly offered himself, like Moses, as a sacrifice for his people. But, like Moses, Carlo Borromeo remained untouched by the plague, as did also his twenty-eight priests.

But his devoted labors and his self-denying habits of life proved at last too great a strain for his strength, and he died before he had reached the age of fifty, leaving a record of unusual activity and accomplishment for so short a life. Much of his income had been spent in adding to the beauty of the cathedral and other churches. And he had given his efforts unsparingly toward the improving of conditions in the churches under his control.

No wonder that one of the chief memories crowning and blessing the glorious white marble cathedral of Milan is that of St. Carlo Borromeo, who practiced mercy and risked his own life in faithfully carrying out the duty of a good shepherd.

Beneath the dome of the cathedral which he himself had consecrated, in a chapel bearing his own name, his body lies in a silver sarcophagus among the people he loved so well.



THE CITY OF MILAN, WITH ITS CATHEDRAL OF MANY PINNACLES AND STATUES

THE BRAVE CONSTABLE OF FRANCE

DU GUESCLIN is a name honored by the French, for they had a hero of that name in the warlike Middle Ages, and French boys and girls delight in stories of what he did and said.

Bertrand du Guesclin was born between 1314 and 1320 in a castle in Brittany. As a boy he cannot have been a very agreeable playmate, for he was obstinate, sullen, quarrelsome and ever ready to fight. An old chronicler says he was the ugliest boy between Rennes and Dinant, that he roamed about with peasant boys and could not be taught to read. It cannot be denied that he was headstrong and restless. At sixteen he ran away from home.

But for all his troublesome ways, the boy had in him the making of a great and clever general. He became a strong man, a brave soldier, a devoted patriot and a defender of his country, a foe worthy of the Black Prince. His countrymen used to boast that they possessed the bravest general in Europe. Du Guesclin fought first in the War of Succession in Brittany, and then attracted the attention of his king, Charles V, who saw in him the very leader needed to drive the English out of France. After the Treaty of Bretigny, the free-lances, who were soldiers paid to fight for others, were disbanded and wandered about plundering and slaying the inhabitants. The country was in a dreadful state, so King Charles bade Du Guesclin rid the land of these robber-soldiers. Then the Breton gathered these men of the robber bands together and led them in an expedition against Pedro, the cruel king of Castile, who was ruling so badly that one of his half-brothers had come to beg King Charles's aid in turning him off the throne.

The Great Bertrand.

Du Guesclin was successful; but when the Black Prince was sent by Edward III of England to help the defeated Pedro, some of the soldiers went back to the side of their favorite leader, the Black Prince, and Du Guesclin was defeated and captured at the battle of Navaretta, near the Ebro, in 1367. He was taken a prisoner to Bordeaux, where he soon grew tired of the irksome captivity.

It is said that one day the Black Prince met Du Guesclin in the town, and going up to him, said:

"How do you do, Bertrand?"

"Well," replied Du Guesclin, "for they say I am the greatest knight in all the world, since you dare not allow me to be ransomed."

Nettled at this, the English prince told the prisoner to fix his own ransom.

"A hundred thousand livres," replied Du Guesclin.

This was an immense sum for those times; so the Black Prince asked in astonishment where he could get all that money. The reply was: "There is not a spinner in France who would not spin a distaff full to help to pay my ransom."

The French people did soon ransom Du Guesclin. Charles made him Constable of France, and, after the death of the Black Prince, he gradually freed his native land. When Du Guesclin was besieging a castle in Languedoc, the English governor promised to surrender it on a certain day if he were not relieved before. The Constable fell ill, and died before the day appointed for surrender, so that he could not take the castle. But the English governor refused to dishonor his word, marched with his garrison to the enemy's camp, and laid the keys of the castle on the dead hero's bier.

Du Guesclin's last words were: "Never forget that, wherever you wage war, the clergy, the women, the children and the poor are not your enemies." And this was the humane principle that the brave and chivalrous warrior, though rough-hewn by nature, followed in all his campaigns and battles. He was buried in the Church of Saint-Denis.

THE NEXT STORY OF GOLDEN DEEDS IS ON PAGE 3805.

Somersby Rectory, where Tennyson was born.

Shiplake Rectory, where Tennyson wrote.

THE FAME OF ALFRED TENNYSON

CONTINUED FROM 3316

ALFRED TENNYSON, who was given the title of Lord Tennyson in his seventy-fifth year, was born on August 6, 1809, at Somersby, Lincolnshire, where his father was the rector. Till he was forty years old he was comparatively poor—too poor to marry—but during the third quarter of the nineteenth century he became known as the representative English poet of his generation.

He was the poet, of all others in the story of English literature, who most clearly knew popularity and prosperity. Before he died, on October 6, 1892, he reigned as the unchallenged modern king over the realm of English books.

Some critics of a later generation have started a fashion of belittling his work. They suggest that neither the English people of the half-century between, say, 1840 and 1890—the central Victorian period—nor their favorite poet Tennyson, deserved the reputations claimed for them in writings of the day.

Unquestionably Tennyson represented with remarkable truth the serious mind of England during that half-century. If it was a dull and commonplace age, of which a cleverer generation of to-day may speak slightingly, Tennyson must suffer with the rest of the Victorians.

They had their faults. Each generation has weaknesses which appear odd to its grandchildren. Strains of affectation, of mincing manners, of gross language, of absurdly overdone sentiment, of stupid hypocrisy, of giggling frivolity, and other follies, have appeared as fashions from time to time. They can be traced in the literature of their day; and Tennyson's time was not free from such mannerisms.

In one part of the period there was an excess of rather sickly sentiment, and Tennyson, like Dickens, caught it. There was also a young-ladyish air of thin romance, and the poet was a little touched by that. Furthermore, soul-storms were, as a fashion, very severe, and were regarded with immense self-interest, whether they tended toward Byronic wickedness or to religious doubt. These moods were in the air then, but now they seem rather unreal. To use them as important considerations in judging Tennyson as a poet is to give them a wrong value.

Apart from outworn fashions in feeling, and in spite of them, we believe that Tennyson stands in the first rank of English poets if anyone is admitted to it except Shakespeare and Milton. Or, to give further names, if

Wordsworth has a right there, so has Tennyson, by virtue of the exquisiteness of his best work and by its almost unequaled variety. No poet is ever judged by his weakest writing. That is forgiven in thankfulness for the best. So let it be with Tennyson.

THE BOOK THAT STARTED TENNYSON'S FAME AND FORTUNE

Tennyson lived for poetry. There was never the least likelihood that he would be anything but a poet. His first poems were published, with more by his older brother Charles, when he was a youth at home. His second volume came out when he was at Cambridge, after he had won the college prize poem. His third volume appeared in 1832, after he had left Cambridge owing to the death of his father. He did not publish any more for ten years, and then, in 1842, he issued two volumes. These included new poems and revisions of his former books, with great improvements. It was the beginning of fame and fortune.

Tennyson's poems were a direct outgrowth from his early life, and reflected it. His earlier writings showed the Lincolnshire of his boyhood, and for many years his native county and its people provided occasional subjects.

But his college life at Cambridge was an even more powerful influence than Lincolnshire on his character and poetical career. There he met his beloved friend Arthur Hallam, son of the historian. The two traveled in the Pyrenees, and Arthur became engaged to Tennyson's sister. His friend's death abroad, in 1833, plunged Tennyson into the deepest grief, and for many years he continued to celebrate the friendship in a long series of brief poems. They were not published until seventeen years after they were begun.

HOW THE DEATH OF A FRIEND GAVE A GREAT WORK TO THE WORLD

The death of Arthur Hallam gave Tennyson a graver hold of life. The poems trace the gradual lessening of his grief, and by 1847, when The Princess was published, Tennyson clearly had recovered his cheerfulness. In 1850 the poems about the loss of friendship with young Hallam were given to the world as In Memoriam, and extended and deepened the poet's popularity. In the same year he was appointed poet laureate to succeed Wordsworth. A poet laureate in England means one attached to the royal household. The office dates from 1617.

Almost at once Tennyson showed that at last the country had a real poet laureate, by his Ode on the Death of the Duke of Wellington. The Crimean War brought forth The Charge of the Light Brigade, and the story love-poem of Maud. Then the poet took up in earnest the task of retelling the legends of the fabled British King Arthur and his Round Table. He planned the Idylls of the King to be his greatest work. He had long been working, at intervals, on the materials of romance in Malory's Morte d'Arthur. Though the Idylls continued to appear from time to time during a dozen years, and created a fashionable taste for the unrealities of a bygone age of chivalry, they, on the whole, do not really add to Tennyson's reputation.

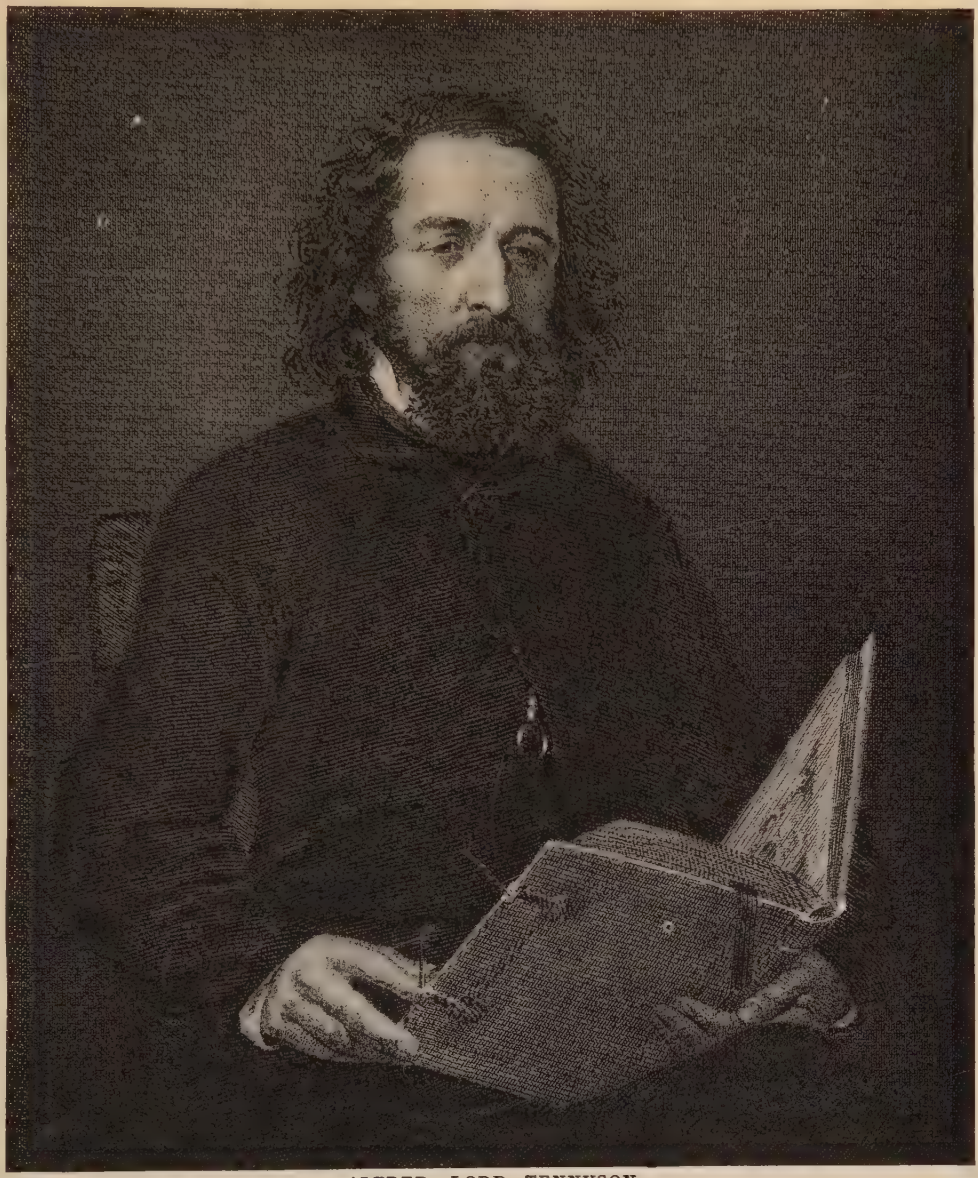
PERHAPS THE MOST PERFECT POEM IN ENGLISH WRITTEN IN OLD AGE

The poet next turned for his subjects to the simple life of country people as he knew them in his youth. The seaside gave him Enoch Arden, and the inland wolds The Northern Farmer. In the Seventies he made a new departure by including the drama in his range of experiments, and wrote Queen Mary, Harold, and Becket. The first and last and some smaller pieces were produced on the stage by Sir Henry Irving with a fair degree of success, though the poet was not naturally dramatic.

In 1880 Tennyson, who had then passed his seventy-first year, added to his remarkable range of poetic achievements by a volume of Ballads and Poems, which included some of his finest and most stirring verse. Later, until he was well past eighty, he published further illustrations of his varied skill, some of his pieces being revisions of earlier writings, others giving striking proofs that his inspiration was still fresh. Indeed, his last poem, Crossing the Bar, prophetic of the manner of his own death, is perhaps the most perfect English poem written in old age, and the choicest gem from a life spent for poetic beauty.

Sunset and evening star,
And one clear call for me!
And may there be no moaning of the bar,
When I put out to sea,

But such a tide as moving seems asleep,
Too full for sound and foam,



ALFRED, LORD TENNYSON

When that which drew from out the boundless deep
Turns again home.

Twilight and evening bell,
And after that the dark!
And may there be no sadness of farewell,
When I embark;

For though from out our bourne of Time and Place
The flood may bear me far,
I hope to see my Pilot face to face
When I have crossed the bar.

Tennyson's death fulfilled to the utmost perfection the wishes of that poem. Life ebbed quietly away in undisturbed serenity. Throughout, it had been a poet's life, devoted to high aims, nobly pursued in a spirit of exacting art. Tennyson, like Milton, was consecrated to poetry and never descended to life's baser levels.

The range of his work is remarkable. In that respect Shakespeare alone surpasses him. In his youth he naturally

was attracted to classical subjects and a classical style. His earliest poems, in fact, had more style than substance. They were exercises in style. But as he gathered strength he produced verse in the classical vein of the greatest beauty and perfection. The Lotus Eaters and Ulysses are supreme examples.

Probably it was his classical tendencies that led him to take the Arthurian legends for the subject of his most ambitious work. Increasingly it is felt, as the glamour with which the poet surrounded the subject is dispersed, that the legends are too slight for the epic form.

TENNYSON THE GREATEST ENGLISH RELIGIOUS TEACHER OF HIS TIME

The Idylls are a somewhat unreal collection. They are neither life nor robust legend nor allegory. Only two, Guinevere and The Passing of Arthur, reach the loftier levels of poetry. Tennyson has proved that the Arthurian Myth will not make a great continuous poem. That he made a mischoice of a subject, or rather persisted with it too long, is not a reason for criticism. It was a misadventure. Where he did succeed in the Idylls he succeeded finely.

Besides high achievement in classical poems and varying success in bygone romance, Tennyson expresses in his poetry his attitude toward great questions of the day. It was a time when newly revealed truths of science were applied to religion and to old beliefs. Tennyson faced such problems. In Memoriam is his greatest poem. Its influence in broadening men's thoughts of religion was immense. Gradually it penetrated into the inmost strongholds of ignorance. Tennyson was unquestionably the greatest, though the most silent, religious teacher of the nineteenth century in England.

TENNYSON'S VIVID PICTURES OF THE COMMON LIFE AROUND HIM

From the patriotic point of view he was the one great poet laureate England has ever had. Before him patriotic poetry had been incidental, as in Shakespeare, Cowper and Campbell; and official patriotic poetry had been contemptible. But in his Ode on the Death of the Duke of Wellington Tennyson suddenly raised a just patriotic pride to the height of greatness. He repeated his success in The Revenge, a ballad of the fleet, The Defence of Lucknow and The Charge of the Light Brigade.

As a song-writer his place is in the foremost rank and close to the centre of the stage. Not only had he a wonderful ear for word music, but also a nature that registered the vaguest tones of haunting romance. In his songs the dullest could catch some echoes of "the horns of Elfland faintly blowing."

Another fine feature of his poems was the stimulus they gave to the study of the outdoor world. No poet has described with greater truth and insight, often in an unforgettable line, the beauty of birds and flowers, and the impressions left on the mind by the play of winds and waves, and the age-long changes of the much-enduring earth. He was a great master of the finely sculptured phrase.

Comparatively late in life he astonished his admirers by turning from the romantic past and picturing with vividness and with deep and true humor the common life around him. We have the Lincolnshire farmers known during his youth, the village wife, the grandmother who had reached the period of dotage, the passion of motherhood, as in Rizpah. Here he came into closest touch with the realities of life.

A number of his simple story poems have also this closeness to the life of the poor. They were the writings of "a good neighbor," as country folk would say. But domestic life was only a small part of Tennyson's country lore. That he could picture the passion of perturbed spirits was proved by his tragedy Maud.

Admitting that there are strains of sentiment in Tennyson that verge on the morbid, as in The May Queen; admitting that some of his Idylls were drawn out into a thinness which will not endure; admitting that his plays, though poetical, do not play well on the stage, there remains in Tennyson's work an immense range of poetry, strong as well as fine, which will command for him a high place in English literature. The most enduring of his works are not, for the most part, those which won the greatest admiration from readers of his own day. Those that won most readily the ear of his contemporaries tell us most about the mind of his age. But beyond these popular poems are rich treasures of pure and lofty verse, in which Tennyson followed faithfully the gleam of his fine ideals and undoubted genius.

THE NEXT STORY OF LITERATURE IS ON PAGE 3687.

HOW DO WE KNOW THE SPEED OF LIGHT?

CONTINUED FROM 3356

WE know the rate at which light travels because it has been measured in various ways, and all the measurements agree. It was Galileo who made the first attempt to measure it. He had two observers some miles apart on a clear night, and gave each a lantern which could be covered by a screen. One observer was to uncover his lantern, and the other, as soon as he saw the first observer's light, was to uncover his. The period between the uncovering of a light and the time it was seen was to be measured. Galileo found, however, that light traveled so rapidly that the distance between the two observers was too small for its speed to be noted.

The Danish astronomer Ole Roemer, working in Paris, made the first real estimate of the speed of light in 1676, and came to the conclusion that it was 186,500 miles a second, a figure which later experiments have proved correct. He noticed, in observing the eclipses of the moons of Jupiter, that the intervals between the eclipses of one moon were not always the same, being 16 minutes, 26 seconds, greater at one time of the year than at another. He decided that this difference could not be due to any real difference in the period of the eclipses, but must be caused by the greater or less distance over which the light had to travel from Jupiter to the earth when the earth was at different parts of its orbit, and therefore nearer to or farther from Jupiter. In this he was quite right.

Various methods of measuring the speed of light have been adopted since, and they all give practically the same figure. A very interesting method was that of Fizeau, a French scientist, who made a clever apparatus for the purpose. In this he allowed light rays to pass through a lens on to a mirror, so that they showed an image of the light at a certain point. The rays then passed through a lens which made them parallel. The parallel beams passed through another lens, and were focused on the surface of a flat mirror. This reflected the rays back through the lenses to form a second image at the point where the first image was seen. The rays then fell again on the first mirror, which was coated with a layer of silver so thin that only half the light was reflected from it. The other half passed through the mirror as through a lens to the observer's eye.

Between the first mirror and the lenses leading to the second, a toothed wheel with 720 cogs was arranged so that the light could just pass between the teeth. The spaces between the cogs were equal in width to the cogs, and the wheel could be turned at any

speed. When the wheel was turned slowly, the light was seen only intermittently, as it was shut off by each cog passing in front of it. When the wheel was turned rapidly, the light which passed through between two cogs was stopped on its way back by a cog which had moved forward in the interval. If the speed of the wheel was then doubled, the light passed through on its way back, as the cog which previously shut it off had now passed on to the next space and let the light through.

By measuring a number of speeds of the wheel in which the light was alternately visible and shut off, and working out a number of very difficult problems in arithmetic, it was possible to find out the speed at which the light was traveling. The result was practically the same as in the other cases.

DO FISHES CLOSE THEIR EYES AND SLEEP UNDER WATER?

Every living creature has its time of rest. Even microbes rest, and plants, and certainly fishes. The answer, then, is yes. But fishes, which are poor, feeble things, do not sleep very soundly. They do not shut their eyes. It would be quite possible to sleep without the eyes being shut if it were not for the trouble of keeping our eyelids up. An animal cannot shut its eyes unless it has something to shut them with. The only things that can shut eyes are eyelids, and ordinary fish do not have eyelids. They are not the only creatures like this. If you look at the snakes in the zoo for a minute or two you notice that they always seem to have their eyes wide open with a fixed stare, although they may be fast asleep. This is because the snakes, like the fishes, have no proper eyelids which they can close. There can be no doubt that when fishes rest at the bottom of a river they sleep. Only they sleep with their eyes wide open, simply because they cannot shut them.

WHERE SHOULD WE LOOK FOR THE EARS OF A FROG?

We must remember that an ear is simply something by means of which the animal can hear, and not necessarily anything we can see. What we call ears are merely outside flaps of skin which, when they are large, serve the purpose of collecting the sounds in the air around. The real hearing is all done inside the skull. In the case of frogs, as in the case of birds and lizards, there is a hole some distance behind each eye. Inside this hole is an inner ear. There is a middle ear, too, for the purpose of conducting the sound to a special nerve, which takes it to the brain, where the real hearing is done. But the frog has no ear that we can see.

WHAT LANGUAGE WAS USUALLY SPOKEN BY JESUS CHRIST?

There is a great group of languages which are all classed as Semitic. Among these languages are some which are named after the old word for Syria, the word Aram. It was one of these Aramaic languages that was spoken by Jesus, for before his time Aramaic had become the language spoken in Palestine. We can learn a lesson here. The Aramaic language itself is not a beautiful one to hear. The words are not beautiful so far as their mere sound is concerned. Nor is this what would be called a highly developed language. It is far from being so. The language which Jesus spoke was humble, and so in keeping with everything else that we know about his life. Yet in this humble language, with its rather ugly sound, Jesus said the noblest and most beautiful things that have ever been uttered on the earth. In whatever language they are now spoken they are no less beautiful, and no more so, for they could not be.

WHY MUST AUTOMOBILES HAVE NUMBER PLATES ATTACHED?

Automobiles have numbers on them for purposes of identification, and also because of a common failing in human nature. If we were all honest and kind, if it were impossible for any of us to do harm without wishing to make it good as far as we could, cars would have no numbers on them. But as cars often do damage they have to be numbered so that they may be known again. Putting a number on the car comes really to the same thing as putting a number on the man who owns it, so that if he does harm, and does not care, we may be able to find him. The fact that cars have numbers can do no harm to honest owners, for they would act the same whether the numbers were there or not. They are put to the expense of paying for the numbers because some other people are not honest. That is what always happens in this world: we must all pay for the wrongdoing or carelessness of others.

WHY DO WE SEE THE FLASH FROM A GUN BEFORE WE HEAR THE NOISE?

When a gun goes off it produces at the same moment the light which makes the flash and the sound which makes the report. Light is believed to be a wave in something which is everywhere, called ether; and sound is a wave in air.

Like all waves, in water, air or ether, these waves take time to travel. Sound-waves travel very slowly compared with light-waves. Sound moves only about a thousand feet in a second, while light will go 186,000 miles in a second! If we are very near the gun we hear the report and see the flash so nearly together that we cannot say which was first. The farther we are from the gun the greater will be the difference of time, because the light reaches us so quickly, while sound comes lagging after it. We see the flash always within a tiny fraction of a second after it has happened, but the sound-wave may take a second or two to reach us if we are far away.

In the same way, if we watch a game of baseball from a distance, we *see* the bat hit the ball, and afterward, we *hear* the bat hit the ball. Light travels from the sun in about eight minutes, and from the nearest of the stars in about three and a quarter years.

WHAT MAKES OUR TEETH CHATTER WHEN WE ARE COLD OR FRIGHTENED?

We may sometimes have the opportunity of noticing what is really the same thing in other parts of our bodies; but for some reason or other the jaw is specially liable to this kind of disturbance. What we notice is that the muscles which close the jaw are being thrown into a quick series of little contractions. When they contract the jaw rises. After the contraction it falls by its own weight. Then the next contraction comes and so makes the chattering.

When a muscle does this we call the act a spasm. Spasms are of two kinds: either the muscle contracts and stays so, or the spasm is in a series of little contractions, as when the jaw chatters. The great fact about all spasms is that they are independent of the will. We do not order the muscles to behave in this way and we cannot stop their so behaving.

The causes of spasm and cramp—which is one kind of spasm—are many. The common fact about them all is that they act, apart from the will, on muscles which really have no business to contract at all except when the will commands them. Various kinds of emotion or feeling, such as fright, may cause a spasm. Cold, if not too extreme, appears to excite the ends of the nerves in muscles. A large number of poisons, such as strychnine and the poison of lockjaw, have the power of causing a spasm.

WHY DOES A FULL BOTTLE KEEP HOT LONGER THAN ONE HALF FULL?

A bottle full of hot water contains more heat than a bottle which is only half full. Water is a wonderful store-house of heat. Different things require different amounts of heat to be put in them in order to be raised to the same temperature. Let us take a certain quantity of water at any fixed temperature we please, and the same quantity of anything else in the world, and make them both five degrees hotter than they were before. We find that we have to put more heat into the water than into the other thing. As it takes longer to heat water than to heat anything else, because we have to put more heat into it, so water takes longer to cool than anything else, because it has more heat in it to lose. Of course, the greater the quantity of water the more heat it has within it.

But there is another point to remember. The bigger the mass of anything the longer it takes to cool. A thing cools from its surface inward; the parts inside it keep each other warm. The smaller the mass of a thing, the bigger is the proportion of its surface to the amount of stuff in it, and so it cools more quickly. So that the case of the hot-water bottles, the different rates at which the sun and the earth and the moon get cool, and the fact that a baby requires to be more warmly clothed than a man, are all explained by the same law.

IS THERE ANY WAY OF FINDING OUT THE AGES OF TREES?

In the case of some trees we can only guess this, but in the case of many we can tell exactly, because the tree makes a fresh growth every year under the bark, and as this differs in the earlier part of the year from the kind of wood which is made later, we can distinguish between one year's growth and the next. When the tree is cut across, we find that it shows a number of rings, one inside the other, and each ring corresponds to a year.

CAN A LIGHTHOUSE MANAGE ITSELF?

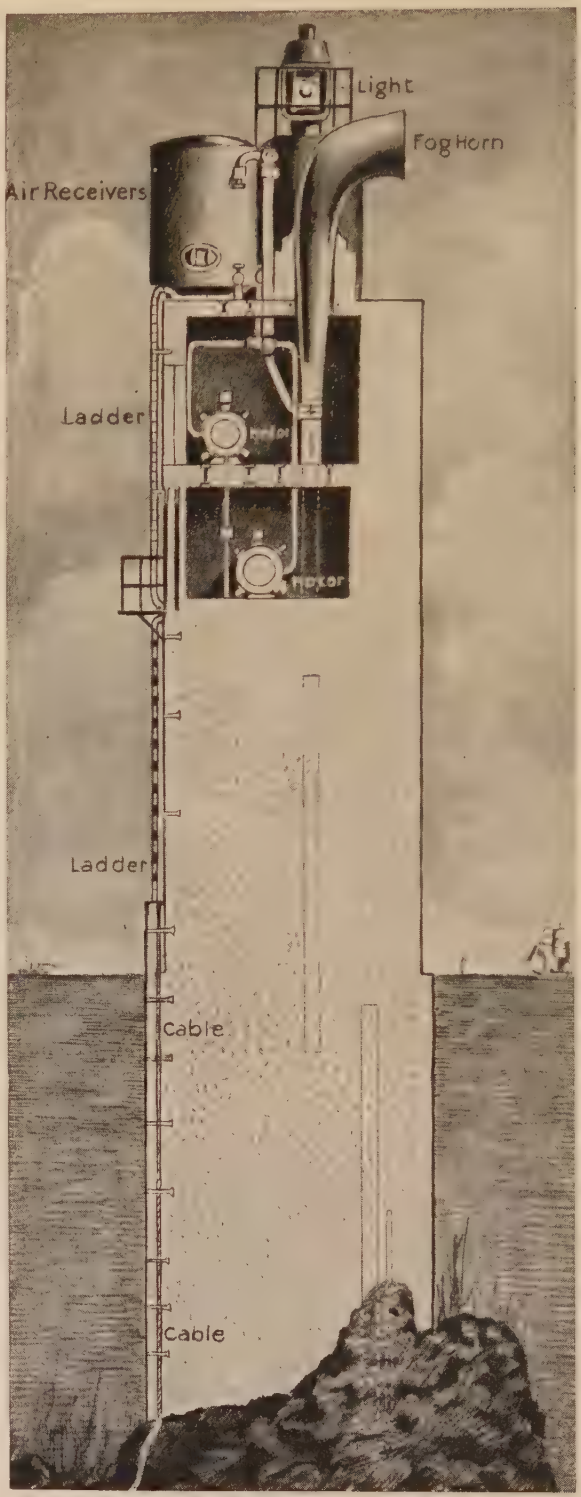
Although it is still necessary for men to lead solitary lives in storm-beaten lighthouses, many light-buoys and some lighthouses now send out warning messages automatically. In most cases acetylene gas is used, an ingenious clock arrangement, or a "sun-valve," switching the gas on as darkness falls and turning it off again when daylight comes.

There is a wonderful lighthouse at Platte Fougere, off the rocky coast of Guernsey, which is entirely controlled from the shore a mile away, and which actually and automatically reports to the mainland any defect in its mechanism. A cable connects the lonely lighthouse and the island.

There are five wires in the cable, and they do these things: report to shore any defect in the mechanism of the lighthouse; indicate when the gas supply is failing; supply emergency electricity to make good the defect; enable passing seamen to speak by telephone to Guernsey; convey 25 horse-power of energy to operate two motors in the lighthouse. These motors drive an air-compressor which works a powerful fog-horn.

Acetylene gas is used for lighting, and the usual supply lasts two months. The gas is turned on and off each night and morning by means of an automatic arrangement connected to a clock, which needs winding only once in three months.

When the supply of gas is within a fortnight of running out, a warning signal is automatically sent along the cable to the shore. Should the sea be too rough to allow a new supply to be taken out, the lighthouse is illuminated with three powerful electric lamps, current passing along the cable for the purpose. At each flash of the light a bell rings ashore, and should anything go wrong with the lamps the bell rings all the time, so drawing attention to the breakdown. In this way the lighthouse calls for assistance.



The machinery of the lighthouse off the coast of Guernsey, controlled from shore a mile away.

WHY IS STRAW SOMETIMES HUNG UNDER BRIDGES?

The practice of hanging a bundle of straw under bridges over navigable rivers and canals is a curious custom the beginning of which no one exactly knows. The bundle of straw is a sign meaning that the bridge is under repair and that sailors must be careful in passing under it in case anything should drop on them from above. Probably this sign was first used by workmen who, having no signboard handy, used a bundle of straw as the most likely thing to attract attention. At all events, the custom is now recognized by sailors all over the country.

WHY DOES CELLULOID CATCH FIRE SO EASILY?

Paper catches fire easily because it is made from vegetable substances which contain large quantities of carbon and hydrogen and not very much oxygen. When it is made hot by a match, the carbon and hydrogen of the paper combine with the oxygen of the air and the paper burns.

Celluloid is made from paper by the use of strong acids and the addition of camphor, which turn the paper into a new compound that has very convenient properties. When hot, it softens, and can then be molded into various forms, which it retains when cooled. Celluloid has very much the same composition as paper, though it differs in some respects, and it burns for the same reason that paper does. The material which makes the hard part of plants, and from which paper is made, is called cellulose. This belongs to the same class of substances as starch and sugar. Celluloid is practically cellulose combined with a proportion of nitric acid and it was formerly a very dangerous substance. New methods of manufacture have made similar substances which are much less likely to catch on fire.

WHY WILL A HAMMER BREAK A STONE WHEN A PIECE OF WOOD WILL NOT?

A stone is held together by a special kind of force in the material of which it is made. This force is called *cohesion,* or sticking together. When the stone is broken, this force is overcome, so that the molecules — the tiniest particles which cannot be seen by the naked eye— are forced apart. If a force is to be overcome it must be by a stronger force. It must be that there is more force in the blow of a hammer than there is in the blow of a piece of wood. That is actually so. The principal reason why the hammer-stroke is more forcible is the heaviness, or mass, of the hammer. The force of a moving body depends on two things, its mass and the speed at which it moves.

WHY DOES A MILK-CHURN TAPER AT THE TOP?

The shape of a milk-churn—broad at the base and tapering toward the top— has become fixed after a great deal of experience, and it is founded on scientific principles. Objects of certain shapes have been found to be better balanced and less easily upset than are others. This is especially the case with the milk-churn, as, the base being much wider than the top, the centre of balance is very low down, so that a considerable exertion of force would be needed to knock it over. When the churn is full of milk, too, it would be even more difficult to upset.

WHY DO WE USE THE EXPRESSION MARE'S NEST?

When a person has made what he thinks is an interesting discovery and it turns out to be nothing after all, we say he has found a mare's nest. The name comes from Mara, a kind of demon, whom people used to think had a nest filled with wonderful treasures. The same demon gives his name to nightmare.

WHY DOES SILVER TARNISH IN THE AIR WHILE GOLD DOES NOT?

There is always sulphur in the air in one form or another, and this sulphur acts on a good many things that may be exposed to air. Especially we notice this where we burn gas. Gas adds a good deal of sulphur to the air. No sulphur compound has any action on gold, so gold does not tarnish. But several sulphur compounds act on silver, covering the surface of it with a film of what is called sulphid of silver, which is black. When we brighten silver we rub this sulphid away. This means that we are slowly losing the silver itself, and in course of time we shall notice the loss. Often people wear silver bangles next the skin, and if it happens that such a person is taking sulphur as a medicine the bangle may turn black. This is because some of the sulphur leaves the body through the skin, and so tarnishes the bangle by forming a film of sulphid of silver on it.

THE NEXT WONDER QUESTIONS ARE ON PAGE 3577.

3478

Photo, Canadian Pacific Railway.

A TYPICAL HABITANT DWELLING, QUEBEC

THE POET OF THE HABITANT

WE tell you about the habitant in the part of our book beginning on page 2949. Dr. William Henry Drummond (1854–1907) in his poems caught the spirit of these simple, unlettered but shrewd people. Usually they speak French, and the result of their attempts to speak English is often amusing. They pronounce many English words according to French rules, and frequently interject French words and phrases. In the poem below Dr. Drummond makes an old man speak of the days that are gone, and of the friends that he once knew. Bord-a Plouffe was once a busy lumber camp, and in summer the Riviere des Prairies was hidden by logs and timber rafts. His poems are amusing, but through many runs a vein of sadness.

OLE TAM ON BORD-A PLOUFFE

CONTINUED FROM 3345

I LAK on summer ev'ning, w'en nice cool win' is blowin'
An' up above ma head,
I hear de pigeon on de roof,
To bring ma chair an' sit dere, an' watch de current flowin'
Of ole Riviere des Prairies as she pass de Bord-a Plouffe.

But it seem dead place for sure now, on shore down by de lan'in'—
No more de voyageurs is sing lak dey was sing alway—
De tree dey're commence growin' w'ere shaintee once is stan'in',
An' no one scare de swallow w'en she fly across de bay.

I don't lak see de reever she's never doin' not'in'
But passin' empty ev'ry day on Bout de l'ile below—
Ma ole shaloup dat's lyin' wit' all its timber rottin'
An' tam so change on Bord-a Plouffe since forty year ago!

De ice dat freeze on winter, might jus' as well be stay dere,
For w'en de spring she's comin' de only t'ing I see
Is two, t'ree piqnique feller, hees girl was row away dere,
Don't got no use for water now, on Riviere des Prairies.

'Twas diff'rent on den summer you couldn't see de reever,
Wit' saw-log an' squar' timber raf', mos' all de season t'roo—
Two honder man an' more too—all busy lak de beaver,
An' me! I'm wan de pilot for ronne 'em down de "Soo."

Don't 'member lak I use to, for now I'm gettin' ole, me—
But still I can't forget Bill Wade, an' Guillaume Lagassé,
Joe Monferrand, Bazile Montour—wit' plaintee I can't tole, me,
An' king of all de Bord-a Plouffe, M'sieu' Venance Lemay.

Lak small boy on hees lesson, I learn de way to han'le
Mos' beeges' raf' is never float upon de Ottawaw.
Ma fader show me dat too, for well he know de channel,
From Dutchman Rapide up above to Bout de l'ile en bas.

He's smart man too, ma fader, only t'ing he got de bow-leg
Ridin' log w'en leetle feller, mebbe dat's de reason w'y,
All de sam', if he's in hurry, den Bagosh! he's got heem no leg
But wing an' fedder lak oiseau, was fly upon de sky!

O dat was tam we're happy, an' man dey're always singin',
For if it's hard work on de raf', w'y dere's your monee sure!
An' ev'ry summer evenin', ole Bord-a Plouffe she's ringin'
Wit' "En Roulant ma Boulè" an' "J'aimerai toujours."

Dere dey're comin' on de wagon! fine young feller ev'ry wan too,
Dress im up de ole tam fashion, dat I lak for see encore;
Yellin' hooraw! t'roo de village, all de horse upon de ronne too,
Ah poor Bord-a Plouffe! she never have dem tam again no more!

Very offen w'en I'm sleepin', I was feel as if I'm goin'
Down de ole Riviere des Prairies on de raf' de sam as den—
An' ma dream is only lef' me, w'en de rooster commence crowin'
But it can't do me no harm, 'cos it mak me young again.

An' upon de morning early, w'en de reever fog is clearin'
An' sun is makin' up hees min' for drive away de dew,
W'en young bird want hees breakfas', I wak' an' t'ink I'm hearin'
Somebody shout "Hooraw, Bateese, de raf she's wait for you."

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Dat's voice of Guillaume Lagassé was call me
on de morning,
Jus' outside on de winder w'ere you look
across de bay,
But he's drown upon de Longue "Soo," wit'
never word of warning
An' green grass cover over poor Guillaume
Lagassé.

I s'pose dat's meanin' somet'ing—mebbe I'm
not long for stay here,
Seein' all dem strange t'ings happen—dead
frien' comin' roun' me so—
But I'm sure I die more happy, if I got jus'
wan more day here,
Lak we have upon de ole tam Bord-a Plouffe
of long ago!

THE HILLS OF SKYE*

This poem by William McLennan, the celebrated translator of French *chansons*, is full of the yearning of the heart for home, wherever it may be. If our home was on the wide prairies we long for their boundless space again, "So and no otherwise, Hillmen desire their hills."

THERE'S a ship lies off Dunvegan
An' she longs to spread her wings,
An' through a' the day she beckons
An' through a' the nicht she sings:—
"Come awa', awa', my darling,
Come awa' wi' me and fly
To a land that's fairer, kinder
Than the moors and hills o' Skye."

O my heart! my weary heart!
There's ne'er a day goes by
But it turns hame to Dunvegan
By the storm-beat hills o' Skye.

I hae wandered miles fu' many,
I hae marked fu' many a change,
I hae won me gear in plenty
In this land sae fair but strange:
Yet at times a spell is on me,
I'm a boy once more to rin
On the hills aboon Dunvegan,
An' the kind sea shuts me in.

O my heart! my weary heart!
There's ne'er a day goes by
But it turns hame to Dunvegan
By the storm-beat hills o' Skye.

PRAIRIE GREYHOUNDS†

This beautiful rhythmical poem is by E. Pauline Johnson, several of whose poems are included in our book. All of her work is musical and pleasing.

WEST-BOUND

I SWING to the sunset land,
The world of prairie, the world of plain,
The world of promise and hope and gain,
The world of gold and the world of grain,
And the world of the willing hand.

I carry the brave and bold:
The one who works for the nation's bread,
The one whose past is a thing that's dead,
The one who battles and beats ahead,
And the one who goes for gold.

I swing to the land to be;
I am the power that laid its floors,
I am the guide to its western shores,
I am the key to its golden doors,
That open alone to me.

EAST-BOUND

I swing to the land of morn,
The gray old East, with its gray old seas;
The land of leisure, the land of ease,
The land of flowers and fruits and trees,
And the place where we were born.

WORK

The Canadian poet E. B. Brownlow in this strong poem emphasizes the joy and value of work done for unselfish ends and purposes. Work in the present, by the light of the past, will bring its own reward in the future.

WORK! use all thy will, give all thy might,
Ply all thy strength,
Until the golden dawn of early light
Shall change at length
Into deep purple shades, soft, pure and bright,
That bring glad tidings of the peaceful night.

Work! while the subtle seasons onward roll
In certain course,
The ways of this frail world to help control;
That keen remorse
In life's last moment—ere thy deeds unroll—
May strike no sudden anguish to thy soul.

Work! taking lessons from the mighty Past,
What men have done;
Yet let not those old masters hold thee fast;
They have begun
What later souls must finish. They have cast
The first stones at earth's evil—not the last.

Work! but seek not false Ambition's flame
To light thee on;
Not so the men of wisdom ever came
In days long gone;
No sordid dream,—no bare desire for Fame
Has left on Memory's lips one worthy name.

Work! in the hope of sowing seedlings great;
Let others reap,—
That, when stern Nature bids thy step abate,
Thy body sleep,
Thy soul shall tremble not at Death's dark
gate,
But calm and sure shall meet its After-Fate.

A GAELIC LULLABY

HUSH! the waves are rolling in,
White with foam, white with foam;
Father toils amid the din;
But baby sleeps at home.

Hush! the winds roar hoarse and deep—
On they come, on they come;
Brother seeks the wandering sheep;
But baby sleeps at home.

Hush! the rain sweeps o'er the knowes,
Where they roam, where they roam;
Sister goes to seek the cows;
But baby sleeps at home.

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OFF RIVIERE DU LOUP*

This poem by Duncan Campbell Scott, the Superintendent of Indian Education for Canada, and an author of note, is a perfectly painted word-picture. Notice the remarkable skill with which he uses color, and light and shade.

O SHIP incoming from the sea
With all your cloudy tower of sail,
Dashing the water to the lee,
And leaning grandly to the gale,

The sunset pageant in the west
Has filled your canvas curves with rose,
And jewelled every toppling crest
That crashes into silver snows!

You know the joy of coming home,
After long leagues to France or Spain;
You feel the clear Canadian foam
And the gulf water heave again.

Between these sombre purple hills
That cool the sunset's molten bars,
You will go on as the wind wills,
Beneath the river's roof of stars.

You will toss onward toward the lights
That spangle o'er the lonely pier,
By hamlets glimmering on the heights,
By level islands black and clear.

You will go on beyond the tide,
Through brimming plains of olive sedge,
Through paler shallows light and wide,
The rapids piled along the ledge.

At evening off some reedy bay
You will swing slowly on your chain,
And catch the scent of dewy hay,
Soft blowing from the pleasant plain.

A ROYAL RACE

The well-known Canadian poet James McCarroll sings praises of homely toil and the simple life.

AMONG the fine old kings that reign
Upon a simple, wooden throne,
There's one with but a small domain,
But, mark you, it is all his own.

And though upon his rustic towers
No ancient standard waves its wing,
Thick, leafy banners, flushed with flowers
From all the fragrant casements swing.

And here, in royal homespun, bow
His nut-brown court, at night and morn,
The bronzed Field Marshal of the Plough,
The Chancellor of the Wheat and Corn.

The Keeper of the Golden Stacks,
The Mistress of the Milking Pail,
The bold Knights of the Ringing Axe,
The Heralds of the Sounding Flail.

The Ladies of the New Mown Hay,
The Master of the Spade and Hoe,
The Minstrels of the Glorious Lay
That all the Sons of Freedom know.

And thus, while on the seasons roll,
He wins from the inspiring sod
The brawny arm and noble soul
That serve his country and his God.

*By permission of the author.

THE RIVER†

The "little river" is a favorite subject for poets, and the Canadian poet Frederick George Scott has expressed its charm and beauty in these rhythmic lines.

WHY hurry, little river,
Why hurry to the sea?
There is nothing there to do
But to sink into the blue
And all forgotten be.
There is nothing on that shore
But the tides for evermore,
And the faint and far-off line
Where the winds across the brine
For ever, ever roam
And never find a home.

Why hurry, little river,
From the mountains and the mead,
Where the graceful elms are sleeping
And the quiet cattle feed?
The loving shadows cool
The deep and restful pool;
And every tribute stream
Brings its own sweet woodland dream
Of the mighty woods that sleep
Where the sighs of earth are deep,
And the silent skies look down
On the savage mountain's frown.

Oh, linger, little river,
Your banks are all so fair,
Each morning is a hymn of praise,
Each evening is a prayer.
All day the sunbeams glitter
On your shallows and your bars,
And at night the dear God stills you
With the music of the stars.

THE ARCTIC INDIAN'S FAITH

In this poem Thomas D'Arcy McGee shows us that the faith of the Indian and the faith of the white man are the same in the worship of the great Providence.

WE worship the spirit that walks unseen
Through our land of ice and snow:
We know not his face, we know not his place,
But his presence and power we know.

Does the buffalo need the pale-face's word
To find his pathway far?
What guide has he to the hidden ford,
Or where the green pastures are?

Who teacheth the moose that the hunter's gun
Is peering out of the shade?
Who teacheth the doe and the fawn to run
In the track the moose has made?

Him do we follow, Him do we fear—
Spirit of earth and sky;
Who hears with the Wapiti's eager ear
His poor red children's cry;

Whose whisper we note in every breeze
That stirs the birch canoe;
Who hangs the reindeer moss on the trees
For the food of the caribou.

That spirit we worship who walks, unseen,
Through our land of ice and snow:
We know not his face, we know not his place,
But his presence and power we know.

†By permission of the author.

THE PLAINS OF ABRAHAM

The author of this poem, Charles Sangster, imagines himself standing on the Plains of Abraham watching that memorable combat which ended in the fall of Quebec, with the loss of Canada to the French and the death of the British and French generals, Wolfe and Montcalm. He contrasts the glory of war with the splendor of peace, comparing one to discord and the other to harmony.

I STOOD upon the plain
That had trembled when the slain
Hurled their proud defiant curses at the battle-heated foe;
When the steed dashed right and left
Through the bloody gaps he cleft,
When the bridle-rein was broken and the rider was laid low.

What busy feet had trod
Upon the very sod
Where I marshalled the battalions of my fancy to my aid!
And I saw the combat dire,
Heard the quick incessant fire,
And the cannons' echoes startling the reverberating glade.

I heard the chorus dire,
That jarred along the lyre
On which the hymn of battle rung, like surgings of the wave,
When the storm at blackest night
Wakes the ocean in affright,
As it shouts its mighty pibroch o'er some shipwrecked vessel's grave.

I saw the broad claymore
Flash from its scabbard, o'er
The ranks that quailed and shuddered at the close and fierce attack;
When victory gave the word
Auld Scotia drew the sword,
And with arms that never faltered drove the brave defenders back.

I saw two great chiefs die,
Their last breaths like the sigh
Of the zephyr-sprite that wantons on the rosy lips of morn;
No enemy-poisoned darts,
No rancor in their hearts,
To unfit them for the triumph over death's impending scorn.

And, as I thought and gazed,
My soul exultant praised
The power to whom each mighty act and victory are due,
For the saint-like peace that smiled
Like a heaven-gifted child,
And for the air of quietude that steeped the distant view.

Oh, rare divinest life,
Of peace compared with strife!
Yours is the truest splendor and the most enduring fame,
All the glory ever reaped
Where the fiends of battle leaped
Is harsh discord to the music of your undertoned acclaim.

THE COLORS OF THE FLAG*

Every Canadian boy would do well to memorize this poem by Frederick George Scott. It voices the high patriotism and true courage which the Canadian troops showed in many glorious episodes in the World War.

WHAT is the blue on our flag, boys?
The waves of the boundless sea,
Where our vessels ride in their tameless pride,
And the feet of the winds are free;
From the sun and smiles of the coral isles
To the ice of the South and North,
With dauntless tread through tempests dread
The guardian ships go forth.

What is the white on our flag, boys?
The honor of our land,
Which burns in our sight like a beacon light,
And stands while the hills shall stand;
Yea, dearer than fame is our land's great name,
And we fight, wherever we be,
For the mothers and wives that pray for the lives
Of the brave hearts over the sea.

What is the red on our flag, boys?
The blood of our heroes slain
On the burning sands in the wild waste lands
And the froth of the purple main.
And it cries to God from the crimsoned sod,
And the crest of the waves outrolled,
That He send us men to fight again
As our fathers fought of old.

We'll stand by the dear old flag, boys,
Whatever be said or done,
Though the shots come fast, as we face the blast,
And the foe be ten to one;—
Though our only reward be the thrust of a sword
And a bullet in heart or brain,
What matters one gone, if the flag float on
And Britain be lord of the main!

THE CANADIAN SONG-SPARROW*

The Canadian poet and statesman Sir James Edgar is the author of this pleasing little poem, which gives in simple language another version of the sparrow's song.

FROM the leafy maple ridges,
From the thickets of the cedar,
From the alders by the river,
From the bending willow branches,
From the hollows and the hillsides,
Through the lone Canadian forest
Comes the melancholy music,
Oft repeated, never changing,
"All-is-vanity-vanity-vanity."

Where the farmer ploughs his furrow,
Sowing seed with hope of harvest,
In the orchard white with blossom,
In the early field of clover
Comes the little brown-clad singer
Flitting in and out of bushes,
Hiding well behind the fences,
Piping forth his song of sadness:
"Poor-hu-manity-manity-manity."

*By permission of the author.

A HYMN OF EMPIRE *

Somewhat in the spirit of Kipling's Recessional is this Hymn of Empire by Frederick George Scott. The former poem speaks the word of caution: this poem voices the desire and need for the expansion of empire.

LORD, by whose might the Heavens stand,
The Source from whence they came,
Who holdest nations in Thy hand,
And call'st the stars by name,
Thine ageless forces do not cease
To mold us as of yore—
The chiseling of the arts of peace,
The anvil-strokes of war.

Then bind our realms in brotherhood,
Firm laws and equal rights,
Let each uphold the Empire's good
In freedom that unites;
And make that speech whose thunders roll
Down the broad stream of time,
The harbinger from pole to pole
Of love and peace sublime.

Lord, turn the hearts of cowards who prate,
Afraid to dare or spend,
The doctrine of a narrower State
More easy to defend;
Not this the Watchword of our sires
Who breathed with ocean's breath,
Not this our spirit's ancient fires
Which nought could quench but death.

Strong are we? Make us stronger yet;
Great? Make us greater far.
Our feet antarctic oceans fret,
Our crown the polar star;
Round Earth's wild coasts our batteries speak,
Our highway is the main;
We stand as guardian of the weak,
We burst the oppressor's chain.

Great God, uphold us in our task,
Keep pure and clean our rule,
Silence the honeyed words which mask
The wisdom of the fool.
The pillars of the world are Thine;
Pour down Thy bounteous grace,
And make illustrious and divine
The sceptre of our race.

DE BELL OF ST. MICHEL †

William Henry Drummond, the "poet of the habitants," is the author of this charming poem. His familiarity and sympathy with the life of the French Canadians has made him their interpreter to English-speaking people.

GO 'way, go 'way, don't ring no more, ole bell of Saint Michel,
For if you do, I can't stay here, you know dat very well.
No matter how I close ma ear, I can't shut out de soun',
It rise so high 'bove all de noise of dis beeg Yankee town.

An' w'en it ring, I t'ink I feel de cool, cool summer breeze
Dat's blow across Lac Peezagonk, an' play among de trees.
Dey're makin' hay, I know mise'f, can smell de pleasant smell.
O! how I wish I could be dere to-day on Saint Michel!

It's fonny t'ing for me, I'm sure, dat's travel ev'ryw'ere,
How moche I t'ink of long ago w'en I be leevin' dere;
I can't 'splain dat at all, at all, mebbee it's naturel,
But I can't help it w'en I hear de bell of Saint Michel.

Dere's plaintee t'ing I don't forget, but I remember bes'
De spot I fin' wan day on June de small san'piper's nes'
An' dat hole on de reever w'ere I ketch de beeg, beeg trout,
Was very nearly pull me in before I pull heem out.

An' leetle Elodie Leclaire, I wonder if she still
Leev jus' sam' place she use to leeve on 'noder side de hill,
But s'pose she marry Joe Barbeau, dat's always hangin' roun'
Since I am lef' ole Saint Michel for work on Yankee town.

Ah! dere she go, ding dong, ding dong, it's back, encore again
An' ole chanson come on ma head of "a la claire fontaine."
I'm not surprise it soun' so sweet, more sweeter I can tell,
For wit' de song also I hear de bell of Saint Michel.

It's very strange about dat bell go ding dong all de w'ile,
For when I'm small garcon at school, can't hear it half a mile;
But seems more farder I get off from Church of Saint Michel,
De more I see de ole village an' louder soun' de bell.

O! all de monee dat I mak' w'en I be travel roun'
Can't kip me long away from home on dis beeg Yankee town.
I t'ink I'll settle down again on Parish Saint Michel,
An' leev an' die more satisfy so long I hear dat bell.

TO ALFRED LALIBERTE

These inspiring verses dedicated to the distinguished French Canadian sculptor Alfred Laliberté are by Isabel McCaw, former assistant editor of the Montreal Star. You will find Laliberté among the Canadian sculptors.

THE formless lump of clay the Master takes;
Insensate, shapeless and inert it seems,
But seeing fingers realize his dreams,
And out of that rough medium life he makes.
A noble form from out the mass awakes
When hidden soul the Master mind redeems,
A vivid spirit from its prison gleams
As, one by one, enthralling bonds he breaks.

The plastic earth the gifted fingers mould
To re-create the people of his race;
Through them a nation's story is retold
In glowing forms of beauty, strength and grace.
And peasant pioneers become sublime,
Heroic monuments for distant time.

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LOVE AND THE YOUNG KNIGHT

The poems of Charles G. D. Roberts are widely known and admired, but not so many are familiar with those of his brother, Theodore Goodridge Roberts, chiefly because only a limited number have been collected and published. Love and the Young Knight, chosen here, shows his idealism, and The Hamadryad the beauty of his poetic expression and choice of winged words.

SAID Love to the young knight, "I am the spur and the prize.
I am the hand of thy 'squire and the light in thy lady's eyes.
I am the force of thy arm, that is more than of sinew and bone.
I am the favour of Arthur smiling down from his throne.

"I am the spirit of Christ, high and white as a star.
I am the crown of Mary, outlasting the helmets of war.
I am valour and peace, anger and gentleness.
I am the master of pride and servant of distress."

Said Love to the young knight, "I am the humble task.
I am the high adventure behind the visored mask.
I am the fire of youth that cools not with the years.
I am the lord of passion and comforter of tears."

THE HAMADRYAD

WAS it the wind I heard starting the leaves athrill—
A wind in the golden birch when the rest of the wood was still?
Was it the wing of a bird, high up in that leafy place,
That gleamed so white to my eye, like the mask of a peering face?

The round moon washed the forest an indescribable blue—
The blue of the unfound rose, the color of dreams come true—
And there in the elfin radiance, deep in the elfin land,
Drunk with the elfin hour, my fingers enclosed her hand.

She led me by the aisles of azure and floating ramparts of sleep
To a castle of hammered silver set in a magic keep.
She led me beyond remembrance of toil and failure and fame,
Back to the glory of youth and the longing that has no name.

Was it the wind I heard starting the leaves athrill—
A wind in the golden birch when the rest of the wood was still?
Was it a wing agleam, or her breast, in that leafy place,
When I opened my eyes to the dawn and felt the dew on my face?

PITTYPAT AND TIPPYTOE *

We shall read in these pages many of Eugene Field's charming poems of child life, but none more charming than this description of Pittypat and Tippytoe.

ALL day long they come and go—
Pittypat and Tippytoe;
Footprints up and down the hall,
Playthings scattered on the floor,
Finger-marks along the wall,
Tell-tale smudges on the door—
By these presents you shall know
Pittypat and Tippytoe.

How they riot at their play!
And a dozen times a day
In they troop, demanding bread—
Only buttered bread will do;
And that butter must be spread
Inches thick and sugar, too!
And I never can say: "No,
Pittypat and Tippytoe!"

Sometimes there are griefs to soothe,
Sometimes ruffled brows to smooth;
For (I much regret to say)
Tippytoe and Pittypat
Sometimes interrupt their play
With an internecine spat;
Fie, for shame! to quarrel so—
Pittypat and Tippytoe.

Oh, the thousand worrying things
Every day recurrent brings!
Hands to scrub and hair to brush,
Search for playthings gone amiss;
Many a wee complaint to hush,
Many a little bump to kiss;
Life seems one vain, fleeting show
To Pittypat and Tippytoe!

And when day is at an end
There are little duds to mend:
Little frocks are strangely torn,
Little shoes great holes reveal;
Little hose, but one day worn,
Rudely yawn at toe and heel!
Who but *you* could work such woe,
Pittypat and Tippytoe?

But when comes this thought to me:
"Some there are that childless be,"
Stealing to their little beds,
With a love I cannot speak,
Tenderly I stroke their heads,
Fondly kiss each velvet cheek.
God help those who do not know
A Pittypat and Tippytoe!

On the floor and down the hall,
Rudely smutched upon the wall,
There are proofs in every kind
Of the havoc they have wrought;
And upon my heart you'd find
Just such trademarks, if you sought.
Oh, how glad I am 'tis so,
Pittypat and Tippytoe!

* From Poems of Eugene Field, copyright, 1910, by Julia S. Field; published by Charles Scribner's Sons. By permission of the publishers.

The Little Cock Sparrow

A LITTLE cock sparrow sat on a green tree,
And he chirruped, he chirruped, so merry was he;
A naughty boy came with his wee bow and arrow,
Determined to shoot this little cock sparrow.
"This little cock sparrow shall make me a stew,
And his giblets shall make me a little pie, too";
"Oh, no!" said the sparrow, "I *won't* make a stew,"
So he flapped his wings and away he flew.

BENJAMIN FRANKLIN HONORED AT THE COURT OF FRANCE

When Benjamin Franklin was the minister of the thirteen states at the French court, his simple manners, quaint speech and ready wit made him a favorite with the frivolous and the wise alike. Here he is being crowned with a laurel wreath. He did not object to anything by which he might with honor make a friend for America. He succeeded in getting arms, money and men, without which the Revolution could not have been won. "Diligent in business," he stood before kings.

The Capitol before the Civil War.

SOME AMERICAN STATESMEN

CONTINUED FROM 3390

IN other parts of our book we have told of many great Americans. Some were statesmen, some were sailors or soldiers, and others showed their greatness in many different occupations or professions. In our stories of the history of the United States we could not tell of all the great men that had a share in building the nation, and in this story we shall say something of a few of the great statesmen.

We might call John Smith the first American statesman. He really understood something about the way that a state must be governed, and he was almost the only man in the Virginia colony that did understand; but he remained in America such a short time that we shall go on to another colonial statesman.

JOHN WINTHROP, FIRST GOVERNOR OF MASSACHUSETTS BAY

John Winthrop is remembered and highly honored in New England as the greatest man in the history of the Massachusetts Bay Colony. He was born in England in 1588, was educated at Cambridge University and became a lawyer. Though successful in his profession, he was not happy in England, for he was a strong Puritan, and did not like the management of religious or state affairs at that time. He determined to move to New England, and was elected governor of the colony that landed in Massachusetts in 1630.

Until his death, in 1649, he was governor or deputy governor nearly all the time, and gave his strength of body and mind and will to keep the little colony on the right path. Some of the old Puritans were very stubborn, and it was sometimes difficult to prevent them from doing unwise things. Through his influence a sort of union of the New England colonies was formed for defense against the Indians or other foes.

Governor Winthrop was married four times and had many children. One of his sons, also called John, was almost as important in Connecticut as his father was in Massachusetts.

BENJAMIN FRANKLIN, ONE OF THE WISEST MEN OF HIS TIME

The next man of whom we speak belongs partly to colonial days and partly to the era of the United States. This is Benjamin Franklin, famous as author, scientist, inventor, business man and statesman. Here we shall think of Franklin the man and the statesman. He was born in Boston in 1706, and was the fifteenth child and the tenth son of his mother. His father was a poor candle-maker, but

the boy became a printer under his brother. They could not agree, and when seventeen years old, the boy ran away, and found work in Philadelphia. He spent some time in London, but returned to Philadelphia, opened a shop of his own, bought a newspaper, and became a prominent citizen. Through him the police and the fire departments, a library and an academy were organized. He invented a stove which used less coal than others to heat a room. Of his experiments with electricity we have told on pages 1248 and 1250.

Franklin was postmaster of Philadelphia for a time, and later Postmaster General for all the colonies. He formed a plan of union for the colonies, which was not adopted, however; went to England to represent Pennsylvania, and remained there as the representative of all the colonies. He helped to draw up the Declaration of Independence, was sent to France to persuade the French to help the states to gain their liberty, and succeeded in getting money, arms and men. His simple manners and his wit made him a favorite in Paris. He was at the head of the government of Pennsylvania for three years, and helped to make the Constitution of the United States. He died in 1790, after a busy and useful life. His autobiography is often read in schools as a specimen of good English, and his Poor Richard's Almanac, full of wise sayings, was very popular when published and is still read.

ALEXANDER HAMILTON, THE FIRST SECRETARY OF THE TREASURY

Alexander Hamilton and Thomas Jefferson are often mentioned together in the history of the United States. This is not because they were so much alike, but because they were so different in their ideas and their lives. We tell you of Jefferson, the Virginian, on page 1042. Hamilton was born on the island of Nevis in the West Indies in 1757, but came to New York while still a boy, and soon entered King's College, now Columbia. He was very much interested in the disagreement between the colonies and Great Britain, and won a great reputation by his writings and speeches while he was no more than a boy.

When only nineteen years old, young Hamilton was appointed captain of a company of artillery. He soon attracted the attention of Washington, and became his secretary, but resigned near the end of the war because he felt that Washington had been unjust to him. At Yorktown he led one of the attacking columns.

After the Revolution he was a member of Congress for a little while, but soon began to practice law, and was very successful. His keen mind plainly saw the weaknesses of the government set up under the Articles of Confederation, and he urged a stronger government. He was a member of the convention which formed the Constitution of the United States, and his writings had much to do with making people agree to accept the new instrument of government.

When the new government began, it had no money and no way of getting it. The country owed a great deal at home and abroad, and no one could see how the debts were to be paid. President Washington appointed Hamilton to the new office of Secretary of the Treasury, and he at once set to work to find ways to secure money. He was wonderfully successful, and soon the new government had money enough, though some people grumbled at the taxes.

The salaries paid by the new government were small, and Hamilton, who had married the daughter of General Philip Schuyler and had several children, felt that he must make more money for his family. He resigned his office in 1795 and returned to New York, but continued to take great interest in politics. During the administration of John Adams he had more influence in the nation than the president himself.

You remember that in 1800 Jefferson and Aaron Burr got the same number of votes, and so the choice was with the House of Representatives. Hamilton did not like Jefferson, but he felt that he was a better man than Burr, and advised all his friends to vote for Jefferson, though some of them wished to vote for Burr. Jefferson was chosen president and Burr vice-president. Burr felt that he had lost the presidency because of Hamilton, and the latter also opposed his desire to be elected governor of New York. Burr challenged him to a duel in 1804, for in those days men often fought to settle their quarrels. Though his own son had been killed in a duel only a little while before, Hamilton accepted, and a meeting took place July 11, 1804, at Wee-

hawken, New Jersey, just across the river from New York. Hamilton was mortally wounded and died the next day.

Few have done more for the United States than this very able man, though we do not to-day feel that he was right in all of his ideas. He believed that the people could not govern themselves, and thought that only men of property and education should vote. He thought that the president and the senators ought to hold office for life, and did not believe in allowing the states to keep much power. He deeply loved his country and served it with all his strength, and his name will be long remembered.

ALBERT GALLATIN, WHO HELD HIGH OFFICE, THOUGH FOREIGN-BORN

Another great statesman, who was born about the same time, was also a foreigner. This was Albert Gallatin, born in Switzerland in 1761 and educated there. He came to Boston as the Revolutionary War was nearly at an end, and went into business. Failing in this, he taught French in Harvard College for a little while. He did not feel happy in New England, however, and moved to western Pennsylvania, then almost a wilderness. The young Swiss was afraid of a strong government and tried to prevent his state from accepting the Constitution of the United States, but did not succeed.

Though he could not yet speak good English, he was sent to the Pennsylvania legislature, and in 1793 he was elected to the United States Senate. There was a dispute about the length of time he had been a citizen, and he was not allowed to remain in the Senate. His state then sent him to the House of Representatives, and there he became the leader of the new Republican party which Jefferson was founding. When that great man became president, he made Gallatin Secretary of the Treasury.

Gallatin believed that the business of a state should be conducted like that of a family. He thought that a state should pay back all borrowed money as soon as possible, just as a family would do. Therefore he set himself to pay off the debt of the United States, and for twelve years worked to do it. All his plans were broken up by the War of 1812, and he went to Europe in 1813 to try to bring about peace. He did not succeed at first, but he was one of the men that made the Treaty of Ghent, which ended the war.

President Madison gave him the choice of becoming minister to France or of taking his old place as head of the Treasury. He chose the former, and remained in France seven years. He was talked of for vice-president in 1824, but was not a candidate, and in 1826 was sent to England as minister. He did not stay long, but came back to New York, and became president of a bank. As he did not have very much work to do, he gave most of his time to the study of the Indian tribes. With the true spirit of public service, he was always ready, to the very end of his life, in 1849, to give advice and help in all questions of government.

JOHN QUINCY ADAMS, DISTINGUISHED SON OF A BRILLIANT MOTHER

The next American of whom we shall speak was born in 1767 in Massachusetts, where his ancestors had lived from the first years of that colony. His father was John Adams, the second president, and his mother was Abigail Smith, of whom we tell in Famous Ladies of the White House. The boy was called John Quincy in honor of his mother's grandfather, and soon showed that he had a remarkable mind. His father was sent to England by Congress in 1778, and the boy went along, but kept up his studies in Paris and Leyden. In 1781, when only fourteen years old, he was appointed private secretary to the minister to Russia, but soon returned to Paris and acted as one of the secretaries of the men who were making a treaty of peace between the United States and Great Britain. When that task was completed, he returned home and entered Harvard College.

After his graduation from Harvard, in 1787, at the age of twenty, John Quincy Adams studied law, but Washington sent him as minister to the Netherlands in 1794, and later he was transferred to Prussia. On his return to the United States he became United States Senator from Massachusetts, in 1803. The next office was that of minister to Russia, and then he was one of the men who made the treaty of peace with Great Britain after the War of 1812.

It seemed that the country could not get along without him, and he was sent to London as United States minister, but was recalled to become Secretary of State under President Monroe. Adams had

had all these honors before he was fifty years old. In the State Department he served eight years and won great fame.

He managed the purchase of Florida from Spain, the discussion of the fisheries disputes with England, and the argument about the Oregon question. The most important thing he did was to write a few paragraphs in one of President Monroe's messages. Known ever since as the "Monroe Doctrine," those words have often been quoted. On page 1914 you have an explanation of the doctrine.

In 1824 John Quincy Adams was elected president of the United States, but many things prevented him from being a success. In the election no candidate got a majority of the votes, and General Andrew Jackson received more than Adams. The House of Representatives chose Adams, and all of Jackson's friends were angry. Then, too, President Adams liked to have his own way and did not get along with Congress, which refused to do the things he advised. He was again a candidate in 1828, but was badly beaten, and went out of office in 1829.

How President Adams spent his last years

Mr. Adams was now sixty-two years of age; he had lived a very busy life, and had held the highest offices his country could give. Many men would have been glad to retire and live a life of ease. Mr. Adams did not think of such a thing. Though he had been United States Senator, Secretary of State and President, he took a seat in the House of Representatives in 1831, and was re-elected term after term until his death.

He spoke on every question that interested him, and spoke so well that he was called the "Old Man Eloquent." His chief work was directed against slavery, and he always said what he really thought. In 1848 he had a paralytic stroke on the floor of the House and died two days later, at the age of eighty-one. No man in all our history served his country more faithfully.

Three men usually mentioned together

Now we come to three men who are often spoken of together, because they were in public life at the same time and had great influence in the nation. All of them served in both houses of Congress, all held Cabinet offices, two were candidates for president, and one was twice elected vice-president. These men were Henry Clay of Kentucky, John C. Calhoun of South Carolina and Daniel Webster of Massachusetts.

Henry Clay was the oldest and came first into notice. He was born in Virginia in 1777, during the Revolution, and went to work as a clerk in Richmond at the age of fourteen. As he was very intelligent and wrote a good hand, a distinguished judge employed him as a sort of secretary. After studying law a little while he was given permission to practice when only twenty years of age, and moved to the new state of Kentucky. His power of making friends was very great, and he was soon successful both in law and in politics.

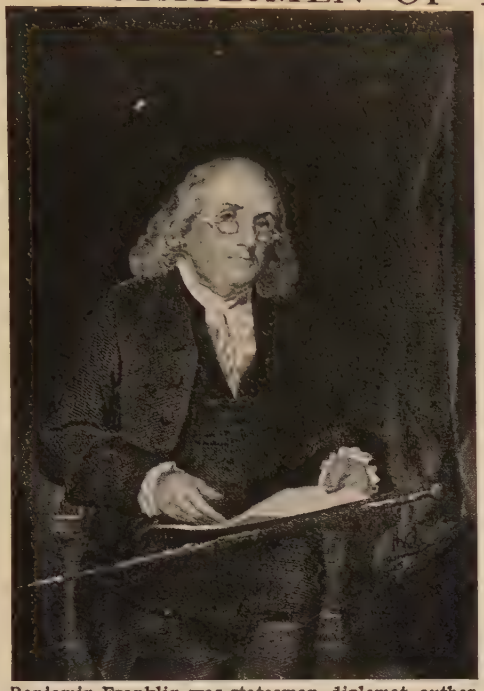
Before he was really old enough Clay was appointed to fill a vacancy in the United States Senate. This time he served only a few months, but was again appointed for a short time in 1809. He now determined to go into politics in earnest. In 1811 he became a member of the House of Representatives and was at once elected Speaker. On pages 1703 and 1704 we have told of the trouble with Great Britain about American ships and sailors. Jefferson and Madison had tried to avoid war, but Clay, Calhoun and other young men favored war so strongly that they were called the "War Hawks." After the war Clay was a member of the commission that arranged a treaty of peace.

Henry Clay arranges the Missouri compromise

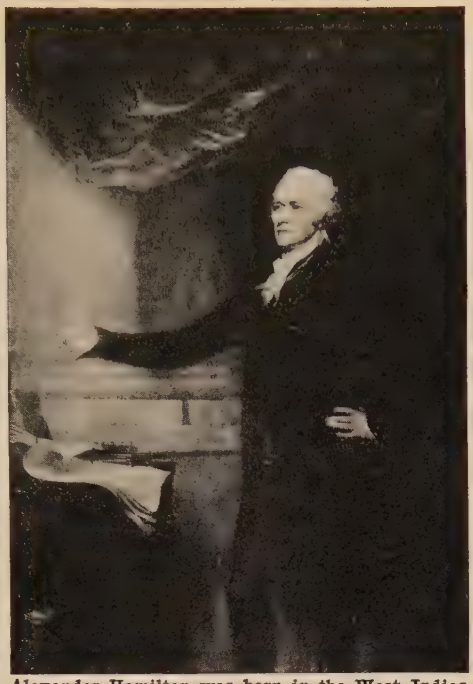
While a member of the House he arranged the Missouri Compromise, about which you can read in the History of the United States, and in 1824 was a candidate for president, but was defeated. During John Quincy Adams' administration he served as Secretary of State, but in 1831 he once more became a member of the United States Senate, where he gained his greatest fame. He was again a candidate for president in 1832, but was defeated by Andrew Jackson. He resigned in 1842, but was the Whig candidate for president in 1844, against James K. Polk. He was again elected to the Senate in 1848, and served until his death, in 1852.

During his long service Clay was noted for two things. He was a strong advocate of a tariff to keep out foreign goods, so that all the articles we needed might

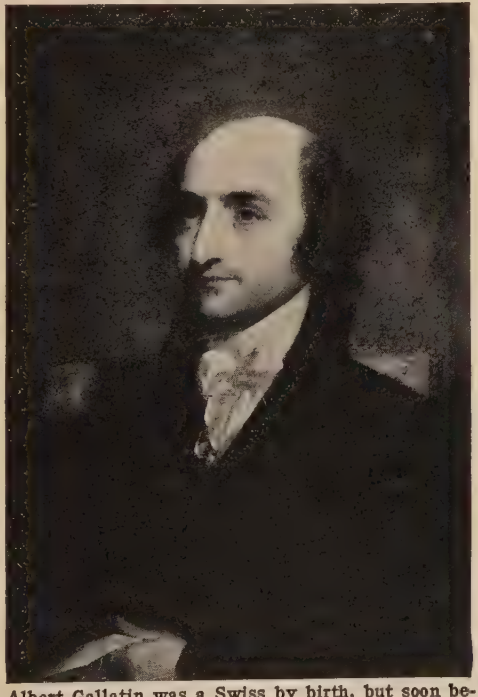
STATESMEN OF THE EARLY DAYS



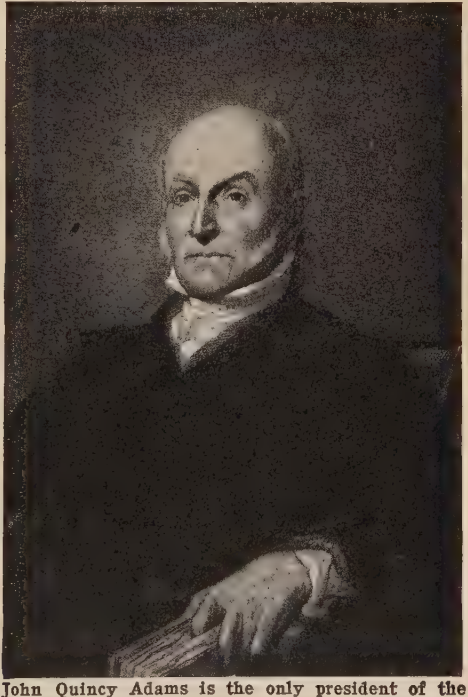
Benjamin Franklin was statesman, diplomat, author, inventor, and with it all a shrewd and able business man. He signed both the Declaration of Independence and the Constitution of the United States.



Alexander Hamilton was born in the West Indies, but came to the United States when only a boy. He won his greatest fame as Secretary of the Treasury. He was killed in a duel with Aaron Burr.



Albert Gallatin was a Swiss by birth, but soon became a good American. He was Secretary of the Treasury under President Jefferson and made a great record. Later in life he was a banker.



John Quincy Adams is the only president of the United States whose father had held the office before him. He held other high places in the government, and died while a member of Congress.

be manufactured in the United States. This policy he called the "American System." He is even more noted for his efforts to settle differences of opinion which threatened to break up the Union.

In 1821, in 1833 and again in 1850 he came forward with plans which both sides accepted, and gained the title of the "Great Pacificator."

Few men in our history have been so much loved as Clay, but he failed to gain the presidency, which he desired above all things. Though he was a candidate three times, there was always some special reason for his defeat. Once, when told that some act of his would lose the presidency, he said, "I would rather be right than president." This is a noble sentiment which every one of our readers should remember.

JOHN C. CALHOUN, VICE-PRESIDENT AND SENATOR

Though John C. Calhoun had a greater mind than Clay, he did not have such power to gain the affections of men. He was born in South Carolina in 1782, and when twenty years of age entered the junior class of Yale College, and was graduated with high honors two years later. After studying law in Connecticut and in South Carolina, he began to practice, but was soon sent to the legislature of South Carolina, and then to the United States House of Representatives, where he favored a declaration of war against Great Britain. In 1817 he became Secretary of War under President Monroe, and made a fine record. He was elected to the vice-presidency in 1825, under John Quincy Adams, and was re-elected. He quarreled with President Jackson, however, and resigned in 1832, before the end of his term.

We have already told on page 1916 of the objection of South Carolina to the high-tariff laws of 1828 and 1832. Though Calhoun had favored a protective tariff in 1816, he had come to believe that such laws were unconstitutional and that they would ruin the South. He declared that a state had the right to decide whether a law was wrong and could refuse to obey it. This is called "Nullification." As soon as he resigned the vice-presidency he was sent to the United States Senate, and there spoke for what he thought were the interests of the South. For nearly a year, in 1844 and 1845, he was Secretary of State under President Tyler, and helped to bring Texas into the Union. After filling this office he was again sent to the United States Senate, and remained there until his death, though his health and strength were failing fast. He died in 1850, while the question of admitting California to the Union was before the Senate.

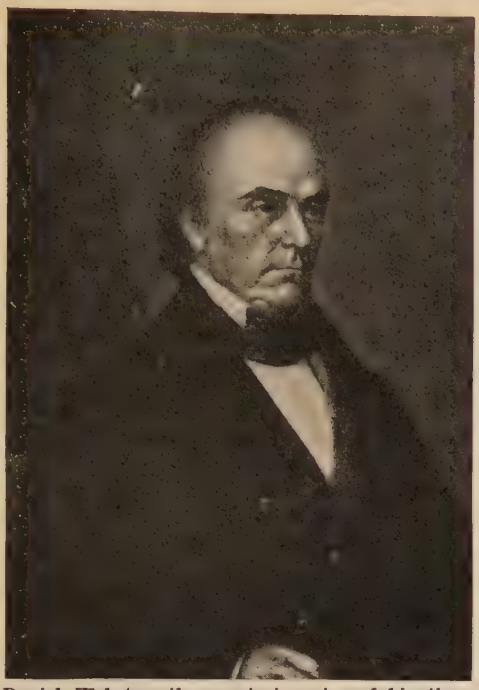
This statesman saw earlier than most of the men of his day that the Union could not continue part slave and part free unless the states had more power than the national government. If Congress tried to make laws upon the question of slavery, there was sure to be trouble. Calhoun loved the South, and in 1849 spoke of "dissolving the partnership," that is, breaking up the Union, as necessary if the rights of the South were trampled upon. He loved the Union, but he loved the South more.

DANIEL WEBSTER, THE EXPOUNDER OF THE CONSTITUTION

We have said that Clay was a great orator and Calhoun a great thinker. Now we come to a man who was great as both orator and thinker. Daniel Webster was born on a small farm in New Hampshire in 1782, the same year as his great opponent John C. Calhoun was born in South Carolina. He was a delicate child, and so eager to learn that his father, a soldier of the Revolution, determined to send him to college. In 1797 he entered Dartmouth College, then a small, struggling institution, and was graduated four years later.

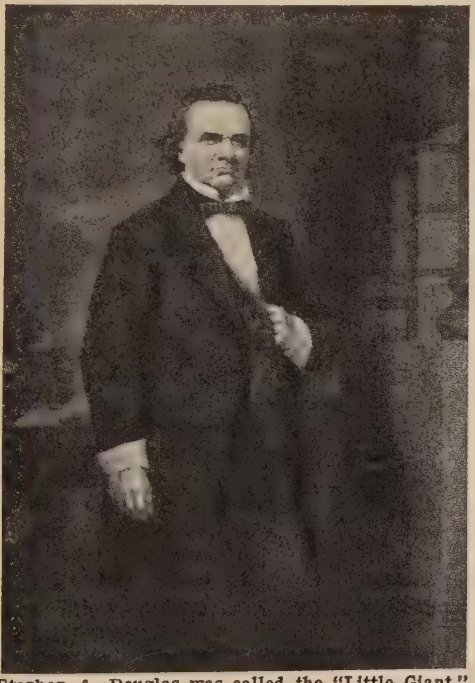
Like so many young men of the time, Webster taught school, but he also studied law, and in 1805 began to practice in a little village near his home. Soon he removed to Portsmouth, then a flourishing town, and in 1812 was elected to the United States House of Representatives, and was re-elected. During his second term he decided to move to Boston, where there were greater opportunities for a lawyer. While in Congress he opposed the War of 1812, as the people of New England felt that it was harmful to that section. Soon after he removed to Boston the people began to speak of sending him to Congress from Massachusetts; in 1822 he was again elected to the House of Representatives, and remained until he was elected to the Senate, in 1827. From that time until his death he was a member of the Senate or else Secretary of State nearly all the time.

STATESMEN OF THE MIDDLE PERIOD

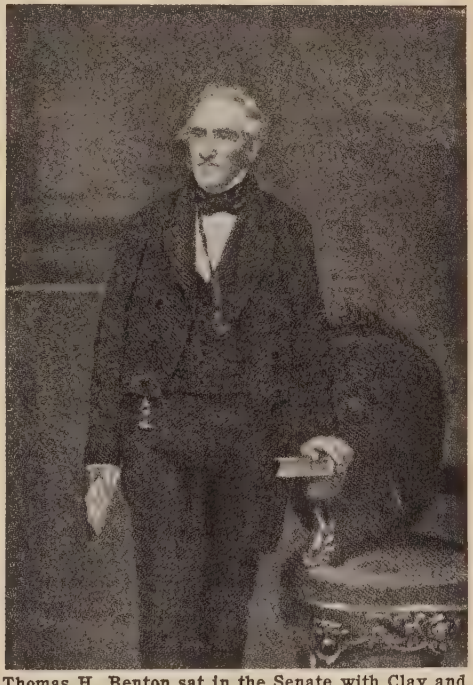


Daniel Webster, the greatest orator of his time, though born in New Hampshire, moved to Massachusetts and represented that state in the Senate for many years. He was twice Secretary of State.

Henry Clay was one of the best loved and most influential men ever in public life in the United States, but he failed to realize his ambition to be president. He was peacemaker while in Congress.



Stephen A. Douglas was called the "Little Giant." He introduced the Kansas-Nebraska Bill, and was defeated for the presidency by Abraham Lincoln. He was only five feet tall, but seemed much taller.



Thomas H. Benton sat in the Senate with Clay and Webster, but opposed them in politics. He was a member of the Senate for thirty years, and wrote a large book telling what he had seen there.

While telling you of Calhoun we spoke of the dissatisfaction of South Carolina over the tariff laws. One of the Senators for South Carolina, Robert Y. Hayne, made a speech in which he said that New England had always been unfair to the South and the West, and that the Union might be broken up if those sections were not better treated. He said also that the Union was simply an agreement between the states and that any state had a right to leave the Union or to refuse to obey unjust laws.

Senator Webster replied in a speech four hours long, in which he defended New England and declared that the Union could not be dissolved. His speech closed with the words: "Liberty and Union, now and forever one and inseparable." This famous speech, "The Reply to Hayne," every schoolboy knows.

In 1841 Mr. Webster became Secretary of State under President Harrison and continued in office for a time under President Tyler. The most important thing he did was to make a treaty with Great Britain which settled the boundary between Maine and Canada. After the treaty had been signed, Mr. Webster resigned and went back to the law. He had bought a farm in Marshfield, near Boston, and loved to spend much time there.

He always spent a great deal of money, and while in Washington had gone into debt. He wished to practice law, for which he could get large fees, so that he would not be troubled about money, but the people of Massachusetts again sent him to the Senate in 1845. He accepted, as he hoped to be elected president of the United States, but in this he was disappointed, as Clay had been.

His last great speech was made in 1850, when he favored the Compromise of 1850. Some of the New England people were opposed to making any compromise with slavery, and Mr. Webster was much abused for his "Seventh of March Speech." While he was not a friend to slavery, he loved the Union and wished to preserve it at any cost. Before the Compromise had passed, President Fillmore offered him the position of Secretary of State, and for a second time he took that great office. He was already a sick man, and it was well that no great question came up while he was in office. In 1852 the Whig party nominated General Scott for president. A party always wishes to win, and always nominates the man who the leaders think can get the most votes. Mr. Webster had made enemies during his long service, and the leaders thought that a military hero might get more votes. This is one of the reasons why many of our greatest men have never been chosen to head the nation.

Mr. Webster was much disappointed, and only a few days before the election he died at his beloved Marshfield. He had had a remarkable life. From a poor New Hampshire farm he had gone on to high position in the nation. He was looked upon as the greatest lawyer and orator of his time. He had gained everything except that which he most desired.

THOMAS HART BENTON, WHO WAS SENATOR FOR THIRTY YEARS

Another statesman who was in the Senate with Webster, Clay and Calhoun, and had great influence there, was Thomas Hart Benton. He was born in North Carolina in 1782, and attended the state university for a little while. His father died early, and his mother moved to Tennessee, where the young man studied law and was soon elected to the legislature. He volunteered during the War of 1812, but saw no fighting.

Missouri was then growing rapidly, and the ambitious young lawyer moved to St. Louis in 1815. He edited a paper, had many quarrels and fought several duels, but made many friends. When Missouri was admitted as a state according to the Missouri Compromise, he was chosen one of the first Senators and served five terms, thirty years. Few men have served so long as this.

In the Senate he took a prominent place, though the measures he favored did not always become laws. For example, he wished to have the president of the United States elected directly by the people, and he was much opposed to paper money. He believed that only metal should be used as money and was often called "Old Bullion" for this reason. He favored building a railway to the Pacific, and he favored also giving farms to the people instead of selling public lands. Both of these things were done after he had left the Senate. When many men thought that the United States should not gain any more territory, Senator Benton believed in pushing on to the Pacific.

Though he had quarreled with Andrew Jackson before he left Tennessee, they became friends again. While Jackson was president Senator Benton was one of his strongest supporters. In some things they were much alike. Both were western men, and though both held slaves, they hated men who were willing to break up the Union on account of slavery. Because Benton grew to believe that slavery should not be extended into some of the new western lands he was finally defeated, and retired in 1851.

He had held office so long that he could not be happy as a private citizen. He was elected to the House of Representatives in 1852, but because of his views on slavery served only one term. Then he was a candidate for governor of Missouri in 1856, but he had lost his popularity and his defeat broke his heart.

STEPHEN ARNOLD DOUGLAS, THE "LITTLE GIANT"

Another western man was younger than any of these, but was almost as important. This was Stephen Arnold Douglas, who was born in Vermont in 1813. His father died soon after the birth of the boy, who at the age of fourteen was apprenticed to a cabinet-maker. But he was determined to do something else, and soon began the study of law. The West seemed to offer a better chance, and he moved to Illinois in 1833 and began to practice law. He made many friends and held several small offices. When only twenty-eight years old Douglas became judge of the supreme court of the state.

He found his place when he became a member of the United States House of Representatives in 1843. In spite of his youth he at once became prominent. He, like Benton, believed that the United States should extend its territory, but, unlike him, was willing to go to war with Great Britain over the Oregon country. He also favored a railroad to the Pacific.

From 1847 until his death he was a member of the Senate, where he was known as the "Little Giant," for he was only five feet tall. In the Senate he spoke on many questions, but the measure for which he is chiefly remembered is the Kansas-Nebraska Bill, about which you may read on page 2429. He believed that the people of a territory ought to decide important questions like slavery for themselves.

Though Senator Douglas owned no slaves himself, his wife, a North Carolina woman, owned some, and the new Republican party, which was growing in Illinois, wished to defeat him for the Senate. Abraham Lincoln was put up as the candidate against him, as you may read in our story of Lincoln on page 1045, but Douglas was re-elected.

In 1860 he was nominated for the presidency by the Northern Democrats, but the Southern Democrats nominated another man, and for this reason Lincoln was elected. Douglas loved the Union and opposed the efforts of the southerners to break it up. He did everything he could to help President Lincoln, but died in 1861, before war really began.

WILLIAM H. SEWARD, A FOUNDER OF THE REPUBLICAN PARTY

When Abraham Lincoln was president he knew how to make skillful use of many able helpers. One of these was William H. Seward, who was born in Orange County, New York, in 1801. He was graduated from Union College in 1820, studied law, and began to practice in 1823. Soon he was elected to the legislature, and became governor of New York at the early age of thirty-seven. He was elected to the United States Senate as a Whig in 1849, and re-elected in 1855, but his dislike of slavery finally led him to help to organize the new Republican party.

Most people expected him to be the Republican candidate for president in 1860, but Abraham Lincoln was chosen instead. President Lincoln at once made Mr. Seward Secretary of State, and in this office he served until 1869. He was always loyal to his chiefs, and managed the foreign affairs of the country with much skill. Besides much difficult business with Great Britain, he got the French out of Mexico and purchased Alaska from Russia. When Lincoln was assassinated, an attempt was made to kill Seward, who was ill in bed. After leaving office he made a trip to Alaska and then went around the world. He died in 1872.

These are a few of the men of the past who deserve to be held in honor by young Americans. There are many more, besides the men of recent times. We can not find space to tell you of all the men who have held high positions during the past fifty years, even if we were sure which of them are really great.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 3605.

MEMORIES OF ALEXANDER HAMILTON

This print shows King's College about 1774, when Hamilton was a student there before the Revolution interrupted his studies. In 1784, at the time he became a trustee, the name was changed to Columbia College. For twenty years he lent his resourceful mind to the work of planning and starting a broad scheme of education, which became the foundation of the great university of to-day.

In 1801 Hamilton built a country house and called it Hamilton Grange. There until his death, in 1804, he carried on his professional work, with gardening, hunting and fishing close at hand for recreation. This picture shows the mansion, very near its original site, but crowded close between modern city buildings at Convent Avenue and 141st Street, New York. In 1924 it was made a public memorial.

Upper picture from an old print, courtesy Columbia University; lower photo, copyright Ewing Galloway.

The European Cuckoo, the messenger of Spring.

THE CUCKOOS

CONTINUED FROM 3374

IN Europe when the first note of the Cuckoo swells through the countryside hearts are lightened and faces gladdened. Unless seasons change and summers fail, winter cannot harry a land where the cuckoo chants. The cuckoo is Spring's own trumpeter. How much its coming meant to our forefathers! Winter was a season of sore discontent to them, shut up in dismal, unsanitary dwellings, in which plague and pestilence lurked, where food was sour and scanty, and the long months of darkness were dreary and unhealthful. When the cuckoo made his joyous proclamation men rushed out to hear him sing. They knew that they could breathe again sweet airs and comfort and gain new life from fresh food in the fields.

The first lyric in the English language was inspired by the bird's arrival. Some unknown poet, emancipated from winter's miseries, burst forth into a song as dear as anything of Shakespeare's. In modern English it runs like this:

> Summer is a-coming in,
> Loud sing Cuckoo!
> Groweth seed and bloweth mead,
> And springeth the wood now—
> Sing Cuckoo!

And so forth—three stanzas of sheer musical delight, lilting from a poet heart seven hundred years ago.

Yes, he is a poet's bird, the cuckoo. Did they know, when they sang of him, his true character, the dark secret of his life? Possibly they did not, for poets in general, unlike Shakespeare and Tennyson, are little skilled in natural history. We know the worst about the European cuckoo to-day. For every cuckoo an entire nest of other little birds has been slain. That is one way of putting a strange fact, the general one, and an excessively wrathful one.

To many people the cuckoo has a horrible fascination, as if his habits were unique in nature. The cuckoo is the herald of Summer. He is handsome and gay; he lives entirely on insect enemies, the "woolly bears." All of these things are to his undying credit; but, on the other side, he is entirely the product of a system of "crime" commonly deemed without parallel. The items to the credit of his account are true, and equally true are the charges against him; but no less certainly is it untrue nonsense to mark the cuckoo down as an exceptional criminal.

What is it that happens? The hen cuckoo lays an egg which is very small

in comparison with the size of the bird. As she never builds a nest, she has no place in which to put it. So she takes it to the nest of another bird, whose eggs her own resembles. The introduction of the eggs may be effected in two ways. If the nest is large and accessible the cuckoo may sit on it for a moment and lay her egg. She may also push out one or more of the eggs she finds there.

THE AMAZING STORY OF THE CUCKOO AND THE EGG IT LEAVES BEHIND

When the nest is very small, or where it is placed in such a position that the cuckoo, which is quite a large bird—nearly fourteen inches long—cannot enter, she lays her egg on the ground, takes it up in her beak, flies to the nest and drops it in, withdrawing at once with another egg not her own. She may break and eat the egg which she has stolen; she may even break and eat other eggs from the nest, but that rarely happens.

Such a practice might lead the builders of the nest to desert it, and the chick which should come from the cuckoo's egg would not be hatched. As a rule, then, one egg is stolen from a nest, as if the cuckoo, with an instinct like that of a practiced boy birdnester, realized that if you put in an egg you must take one away, to lull the suspicions of the brooding bird.

So far the part of the mother. Now for the young one. When this hatches it has a curiously hollowed back. During its second day of life the little cuckoo grows restless, and, working its way beneath any object in the nest, be it egg or young bird, it heaves and struggles with instinctive accuracy until the object is worked to the top of the inner edge of the nest, then tilted over to fall with a crash to the ground below.

THE LOVE OF THE BIRDS FOR THE LITTLE STRANGER IN THEIR NEST

The interloper is thus left in sole possession of the home, and to its care the deluded foster parents devote all their attention, brooding and feeding it with the care due to a creature of their own flesh and blood. We need not believe that they are so misled as to regard this growing monster as their own chick. At the nesting period and after, birds are filled with a yearning love for young bird life, and they will unhesitatingly feed nestlings not of their own kind.

When the rightful owners of the nest return and find their chick dying on the ground they stare at it in pathetic amazement. They know it is their own, and that it has met with disaster; but they do not attempt to help it back to the nest; they do not seek to feed it. They seem to accept it as an unavoidable stroke of destiny.

Then they flutter to the nest and feed the criminal. They feed it constantly while it is in the nest; they feed it when it has outgrown the nest; they feed it when it has become so huge, in comparison with their own size, that they have to perch on its shoulders to put the food into its gaping, clamorous mouth. But they are not friendly to adult cuckoos. Little birds, on which cuckoos prey, combine to mob their enemies. Whether they do so out of inbred hatred of the interlopers, or whether they are misled by its hawk-like outline into mistaking it for a bird of prey, we shall never know. The second suggestion needs consideration.

WHY THE CUCKOO DOES NOT BUILD ITS OWN NEST

It is within the bounds of possibility that, because it is attacked in this manner from age to age, the cuckoo has found it unsafe, or at least inconvenient, to make a nest for itself among so many little enemies. Therefore, it has been driven by this unending persecution to utilize the nurseries of its enemies in the place of those which, if not attacked, it would have been content to furnish for itself. Even supposing there is some truth in this explanation, there is another influence against building a nest.

We have many examples of birds which mate for life and we have instances where one male has many hens; but the position is reversed in the case of the cuckoo. Here it is the hen which has many gallants and squires, and she does not strike up a partnership with any one male. The males by far outnumber the females, and at her call from a bough half a dozen candidates for her society fly to her side.

So there can be no hard-and-fast associations between the sexes as there is with the majority of species, and therefore no settled purpose directed to nest-building and care of the family. It is not certain how many eggs the hen lays in the course of a summer, perhaps as many as fifteen or twenty.

MEMBERS OF THE CUCKOO FAMILY

The Road-runner.

The Egyptian Coucal.

The Golden Cuckoo.

The Great Spotted Cuckoo.

The Giant Plantain-eater.

But in whatsoever stolen nest we look, we nearly always find the intruding egg matching the rest of the eggs in the clutch in a general way. Robin, wagtail, pipit, warbler, hedgesparrow, and the rest, they are all often mimicked as to the size and color of their eggs.

A NEW AND STRANGE DISCOVERY ABOUT THE CRADLE OF THE CUCKOO

This fact led to great confusion until not long ago. The matching of the eggs was supposed to mean that the cuckoo could change the shape, size and hue of its eggs to suit any nest in which it had to be placed. But the fact seems to be that the adult generally returns to the type of bird by which it was reared. Accident, the need of a nest for an egg which is laid when there is no convenient receptacle of the right species available, occasionally leads the anxious cuckoo to place her egg in the first nest she can find. But it is not the rule.

The pugnacious red-backed shrike is imposed on, and rears a cuckoo which, if it is a female, will return to lay its eggs in the nests of other butcher birds. The same policy is followed by the cuckoo cradled in a thrush's nest, in a redstart's nest, and so on. Over eighty species of birds are victimized in this way. Each is believed to give rise to a fixed variety of cuckoo, in the sense that the nestling will grow up to lay in a copy of the nest from which it flew.

THE FOLLY OF THE COWBIRD AND THE WISDOM OF THE CUCKOO

So it is wrong to imagine that the cuckoo alters the outline of its eggs to meet the needs of the hour. It always lays the same kind of egg, but that egg is like the eggs of the bird whose little ones the cuckoo, when little more than one day old, toppled from its nursery to death.

All European cuckoos have this habit, but there are species of cuckoos which are respectable citizens of the bird world, and build nests and hatch their own eggs with propriety and punctuality. The New World cuckoos hatch their own eggs and care for their young. Nor is the hateful habit found only among cuckoos.

As we have already seen, the honey-guide is as confirmed a little poacher as the cuckoo. And the American cowbirds are for the most part just as unscrupulous. They belong to the Blackbird Family, but they not only lay their eggs in the nests of their relatives but in the nests of birds quite unrelated, even going so far in their folly as to drop their eggs into nests which have been deserted. They commit other absurdities with their eggs, too, suggesting that here, at any rate, the decay of the natural instinct for the preservation of the species is accompanied by a failing of acuteness.

Stupid in that way the common cuckoo never is. This bird is as watchful as an eagle. It will prowl in the neighborhood of birds while they build, carefully marking down the best-hidden nursery, and wait for them to lay. Then, at the right time, it will slip its own egg into the nest, and continue the chapter of instinctive misdoing at the expense of another pair of reluctant foster parents.

HOW THE OWNERS ARE LURED FROM THEIR NEST

Even the courage of the little birds in attempting to drive off adult cuckoos is turned to the cuckoo's profit. The male seems deliberately to challenge attention, and draws attack on itself. It flies away, pursued by the owners of the nest. While the male is thus drawing the guardians of the nest from their post, the hen cuckoo darts to the undefended nest and lays her egg. If only the mother cuckoo tarried to tend her infant at its hatching, we might forgive her. But no, parasitism and parental care never go together.

One good thing may be said for the European cuckoos. They eat hundreds of the hairy caterpillars which are such a pest. They are the only birds known to eat these enemies of human comfort.

The cuckoos are a large family of nearly two hundred species, nearly all tropical. Northern Europe sees only the common cuckoo regularly, and the Great Spotted Cuckoo as a rarity. This bird, common in Southern Europe and the warm lands of the East, ignores small birds and victimizes the fighters of the crow tribe. Sometimes a spotted cuckoo will lay three or four eggs in a crow's nest, and that may account for the fact that the interlopers and the rightful heirs to the nest live together in amity till the time to fly arrives.

THE INDIAN CUCKOO, WHICH USES THE NEST OF THE BABBLERS

The Indian Pied Cuckoo effects a lodgment for its egg in the nests of the babblers, and there out go the baby babblers

at the instance of the hatched invaders. Other Indian cuckoos which haunt the same type of nest are called Hawk Cuckoos, from their exact resemblance to birds of prey. It would be interesting to work out the theory of the cuckoo's advantages and disadvantages resulting from this mimicry.

Africa has a Golden Cuckoo into whose plumage Nature has worked the loveliest metallic lustre, parasitic on sparrows and their like, and dining, it seems, on the egg which they remove in order to make way for their own. A dress of handsome bronze clothes allied cuckoos in Australia and India.

American cuckoos are sober in garb. Two species are common, the Black-billed and the Yellow-billed, and are much alike. They are grayish brown above, and grayish white underneath. Their song is harsh, but they feed on hairy caterpillars, and the caterpillar of the gipsy moth. They build apologies for nests, and hatch out their own young. Apparently the parent birds begin to sit as soon as the first egg is laid. The young hatch at different times, and so there may be young of several sizes in the nest. They are fond of the eggs of other birds and often rob their nests. Both species are called "rain crows" in some sections, as their harsh calls are supposed to prophesy coming rain. Some careful observers of birds believe that the birds really have this power. There is also another species, the Mangrove Cuckoo, which belongs to the West Indies but occasionally ventures into Florida and Louisiana.

THE BIRDS THAT FLY LOW ON THE ROADS OF SOUTH AMERICA

Then there are the Coucals, ground-keeping cuckoos which make quite ambitious domed nests; bush-dwelling cuckoos in India and adjoining regions which are called Malkoahs; ground cuckoos of Sumatra and Borneo which run like pheasants; road-runners of South America which fly so low along tracks and highways that they seem to course along the earth; Savanna and Guira cuckoos which not only nest in company, but pile the eggs of several birds in one nest.

The home of a Guira cuckoo having been made, a layer of eggs is laid and covered with leaves. Then another layer is added by another bird, and that in turn is overlaid with a similar covering. There may be two or three such strata, but other eggs are scattered in the foliage amid which the nest is placed, and there must be great loss of eggs and probably of life among the young when the hatching is at an end.

Even now we have not named all the cuckoos. The golden cuckoo has its nearest kin in the lovely Emerald Cuckoo. The California Road-runner, sometimes called the Chaparral-cock, is a ground-living cuckoo, and the Ani also. This is a bronze-black bird which only occasionally comes into the United States. The natives call it the "black witch" and attribute all sorts of crimes to it.

Both Australia and Asia have so-called Pheasant Cuckoos, though the species are far sundered in general characteristics. Perhaps as strange a species as any is the Drongo Cuckoo, a bird endowed with this title from the fact that it is the living copy of the drongo, and profits by the circumstance to penetrate the drongo's nest undetected and there work its act of betrayal.

THE LINKS THAT ARE MISSING FROM A GREAT GROUP OF BIRDS

Was this policy of parasitism at one time more common to birds? No one knows, but the cuckoos are like some of our other birds, so that it is natural to ask whether, seeing that so many kinds were once based on a general physical plan, they shared the cuckoo's peculiarity of nesting and neglect of its young.

On the one side we can now trace an affinity between cuckoos and bee-eaters; then, marching on, we find the plantain-eaters next in the scale of living relatives. Their popular name has been bestowed in relation to their habit of eating plantains, or bananas. That, however, is but part of their diet. They eat many kinds of wild African fruits, and some species take insects, small reptiles, and even young birds.

THE TURACO, WHICH LIVES ONLY IN AFRICA

The scientific name of the plantain-eaters is Turaco, or Turakoo. They number over a score of species, all restricted to the Dark Continent. They vary in size from fifteen inches to two and a half feet long, and within those limits many remarkable and fine specimens of birds are included.

Rich and varied hues adorn the soft plumage of the body; the tails are long

and effective in appearance, and the head is crowned with a fine crest. Green, blue and red are the predominant tones, and naturalists group the whole into two brigades, one embracing all the birds which have red feathers in the wings, the second group those which lack red feathers.

It is well to have this grouping in mind, for it helps us to remember that in the turacos we are brought face to face with a very extraordinary fact. The red matter which colors the feathers dissolves in water like an inferior dye.

There is copper in this red pigment, and no man knows where the birds get it. It has been suggested that the birds may pick up grains of the mineral when feeding. We can change the color of a bullfinch's feathers to sable by feeding him on hempseed. We can convert a pale yellow canary to deep orange by adding cayenne pepper—which he enjoys—to his food when he is on the eve of molting. But is there any evidence that we can alter the hue of a bird's clothes by giving him a mineral to eat?

THE BAFFLING MYSTERY OF THE RED FEATHERS OF THE TURACO

Supposing that here and there a turaco does swallow some grains of copper or malachite, or whatever the substance may be. Only the few birds which found such substances would be affected. But the red coloring matter of all red-feathered turacos contains copper. The pigment is a substance well established in the records of science, and it is called turacin.

Obviously, then, the curious composition of the pigment cannot result from the haphazard collection of foodstuffs taken into the birds' crops. The birds which sport these mysterious feathers are among the species which seem never to feed on the ground, where mineral matter would enter into their diet; on the contrary, they keep to high trees—shy birds, unwilling to expose themselves away from the boughs.

No, it cannot be that. To clinch the matter, we have the fact that turacos kept in captivity have evolved the copper-containing red pigment, year after year, in aviaries where not a grain of mineral matter capable of conversion to such end is obtainable.

The red feathers of the turaco, then, are a complete puzzle to us. We have not the faintest notion how a bird eating fruit and animal food can evolve a metal from its inner substance—a unique feat. Workers among the white ants, or termites, might see a parallel in the fact that where these creatures have labored unmistakable iron is to be found in the substance of their fortresses. That, however, must result from the material in which the termites work, not from conversion of animal matter into mineral.

THE COLOR THE RAIN TAKES AWAY AND THE SUN BRINGS BACK

We cannot explain it; we can only ponder the problem and leave it, in the certain hope that some day the solution will be worked out by some bright mind to which leisure and opportunity and unlimited supplies of turacos come happily all together.

But we must not forget that this confusing red pigment, so doubtful of origin, fades away in water, as we have said. What purpose can this serve in the life and labors of the bird? The turacos live mostly in heavy forests, where in the rainy season moisture descends with an intensity suggesting waterspouts. One good drenching and the red feathers of the turaco blanch, the gorgeous pigment flows away.

If he is well and truly rained on, if he takes a wholesome bath, the deep blush from the turaco's feathers fades out completely and a bird of pinkish white hue is there. Nature must at once set to work to restore the lost pigment, and she does. The red returns, coppery turacin again flushes the pinions of the plantain-eater, and he is a gorgeous red with his green and blue once more.

THE CHANGING PLUMAGE THAT MARKS THE PROGRESS OF THE SEASON

There is deeper design in this than is apparent. Many wonderful plumage changes mark the progress of the season. Feathers bleach and fray, like the weathered leaves of autumn trees, and fall easily, like those leaves. Some grow light and pale under the influence of the sun; some grow dark under the influence of moisture; but in the turaco, as we see, wet makes fine feathers pallid, dry weather permits the baffling pigment to return and the feathers to be bright again. This is one of those things we cannot understand. There are hundreds of them in nature, and the more we study, the more mysteries we find to puzzle us.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 3613.

HOW TO MAKE A TOY SUBMARINE

CONTINUED FROM 3380

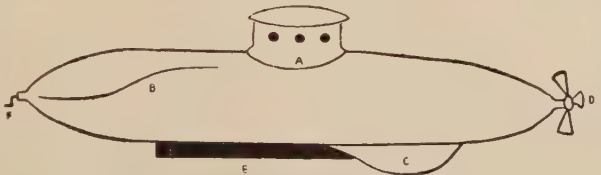
MOST boys have either seen a real torpedo boat, or have seen a picture of one dashing over the sea. They are wonderful little ships that travel almost as fast as an ordinary railway train—twice as fast as the great men-of-war that they are intended to destroy. They dash out at a speed of nearly forty miles an hour toward the great ships, and, when they are quite close, they fire one of the deadly torpedoes they carry, and the torpedo swims under water like a fish until it strikes the big battleship. Then it explodes and blows a huge hole in the side of the ship. One torpedo would sink the biggest ship ever built if it struck the hull under the water-line.

But there are even more wonderful boats than these. They are the submarines—the little torpedo boats that swim entirely under water so that no ship can see them coming. They can dive deep down out of sight and fire their torpedoes while they are almost underneath the great battleships.

Perhaps it has never occurred to you that you might make a model submarine that would swim under water just like the real ones. Yet you will not find it difficult if you read this description first, and carefully follow the directions, and when you have completed it you will find it one of the most fascinating things you have ever had.

You can make it swim in a bathtub or a small pond. It will dive under water and travel twenty or thirty yards before it comes up again. With your submarine torpedo boat you can play at a naval battle with your friends who have ordinary wooden boats that float. The floating boats will represent the men-of-war, and you will try to make your submarine swim under the water and hit them. If it touches a boat you must consider that boat destroyed, for that is what would happen in real war if a submarine got close enough. Now let us see how to make it.

First, you must get a piece of wood about 8 inches long and 2½ inches thick. A piece of curtain pole will do splendidly, if you can find one that is made of soft wood. With a sharp knife you must cut the two ends to rather sharp points. When this is done your piece of wood will look like a big cigar. The ends should be rubbed with sandpaper till perfectly even.



1. The submarine boat complete. The letters mark: *a*, Conning tower; *b*, curved fin; *c*, keel fin; *d*, propeller; *e*, lead keel; *f*, handle.

Now you must drill a hole from one end of the wood to the other. This can be done with a long gimlet. You can bore from each end till there is a hole right through.

Next you must buy a pea-shooter from a toy-shop—it will cost a few cents—and with a file you must cut off two pieces about 1 inch long. You must make the hole rather bigger at each end of the wood and let in the pieces of pea-shooter. Each piece should project a little, as you can see in picture 5.

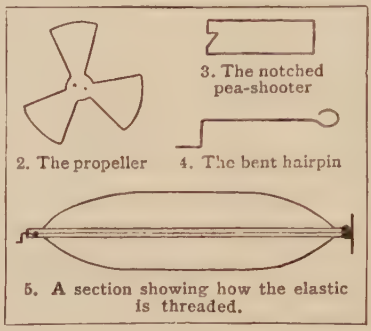
The next thing you have to do is to make the propeller, or "screw," that will drive the submarine. This will be quite easy. You have only to knock the bottom out of a small tin can, and cut it to the shape shown in picture 2. The fan-shaped pieces must be twisted slightly like the propeller of a real ship.

Now drill two small holes in the centre, close together, and pass a piece of elastic through them—the sort of elastic that is used for catapults. Get a big glass bead, rather larger than the diameter of the pea-shooter, and thread the elastic through this; then pass the elastic right through the hole in the centre of the wood.

Now, at the other end, file two little notches in the pea-shooter as shown in picture 3. Then make a little handle out of a hairpin, bent as in picture 4, draw the elastic rather tight, hook it on to the handle as in picture 5, and then the mechanical part is done.

If you hold the propeller still and turn the handle at the other end, the elastic will be twisted up tightly. Then, when you release the propeller, it will buzz round quickly and, of course, when you put your ship in the water, it will drive it along.

But at present your boat will float. To overcome this you must get a piece of lead tubing. This should be beaten out flat and nailed along the wood to form a keel. It is of the right weight if, when you put your boat in the water, only just the top shows above the surface.



To make it dive you must nail "fins" to it. These fins are easily cut out of tin, and they must be put on with a slight tilt, as shown in picture 1. A straight fin at the bottom will make it complete. Now wind the elastic tightly, holding the propeller with the left hand. Then put the submarine boat in the water, still holding the propeller. Hold the boat steadily about a foot beneath the surface and then let the propeller go. At first your submarine will try to rise, but as it begins to travel faster the fins will keep it below the surface and it will dart along through the water just like a fish.

If you want it to look particularly smart you can make a "conning tower" out of a piece of wood and fix it to the top.

When you have tried it and made sure that it travels well, give it a coat of gray paint, and then it will look just like one of the real submarine boats of which you have heard so much.

If you use it in a pond you need never fear you will lose it, because it will stay under water only so long as the propeller is revolving. When the propeller stops, the boat floats to the top of the pond.

HOW TO DANCE THE MORRIS DANCES

THE quaint old English Morris Dances, though of Moorish origin and taken into England in the Middle Ages, perhaps from Spain by John of Gaunt, became very popular in that country. The country folk altered them to suit their own ideas of a dance for holidays and feast days, so that from the time of Queen Elizabeth no festival was complete without the "merrie Morris men." Just when the dances were in danger of being forgotten, new interest in them arose, and now they are much practiced in gymnastic and dancing classes. The old tunes which go with them have also been preserved and adapted to the modern piano. They are in various times, and the step also changes in height and length.

And first, how do the dancers dress, and what do they need? The old Morris men wore very fantastic garments, but girls and boys who dance now can hardly do better than to wear the simple rustic ones worn by country people—the boys, or girls taking the boys' parts, Holland smocks and hats; the girls, cotton frocks and sun-bonnets. All of them wear elastic bands round the leg, on to which four or more bells are sewn. These can be bought at 10 cents a dozen. Ribbons may be worn, but the bells are essential.

Then sticks will be wanted for some of the dances—plain round wooden sticks about eighteen inches in length. They can be bought in bundles, or made at home from curtain-rollers or sticks for tying up flowers. Each dancer will want two handkerchiefs.

The Morris Dances have a special step and a peculiar jump; one or the other, the step or the jump, is going on throughout the dance. The jump is taken with the body held straight and then raised by springing suddenly with both feet off the ground. The feet land on the ball of the foot, the toes touching before the heels, so that the spine is not jarred. The step is easily imitated when once seen, and the music almost suggests it. In Bean Setting you raise the right foot as you do in taking a walking step, and move it forward so that the heel is about as advanced as a foot length from the toes of the left foot. Then hop twice on the left foot, and repeat the step with the right foot.

One form of the step used in the Laudnum Bunches bears a likeness to the polka step, only danced with stiff knees, hopping on right, on left, on right, and on right again, with left extended in front.

In the high step which belongs to the Capers movement described later on, the toes of the lifted foot are as high as the knee of the other leg. The step matches the music so well that it is difficult not to keep time.

The names of the Morris Dances are as quaint as themselves, and suggest their country origin. The best known are probably Bean Setting, Laudnum Bunches, Rigs o' Marlow, the Old Woman Tossed Up in a Blanket, Constant Billy, Shepherd's Hay or Hey, Bluff King Hal, Trunkles, Blue-eyed Stranger, Country Gardens, The Cuckoo's Nest, and Princess Royal.

Thoroughly characteristic are the first two of these, which are here described in detail. In these dances six dancers form a set, and start in two files with faces toward the music, No. 1 dancer nearest to it, like this:

Dancer No. 1 partner with dancer No. 2.
Dancer No. 3 partner with dancer No. 4.
Dancer No. 5 partner with dancer No. 6.

HOW TO MAKE OUR OWN EASTER EGGS

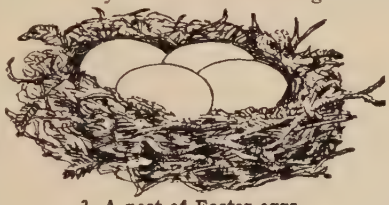
THE Easter egg is a beautiful idea. It is a symbol of the return of spring, for the egg contains in it, in a mysterious way, the promise of life. All over the world friends give and take presents of Easter eggs; in the country, perhaps, a basketful of the freshest new-laid eggs; but in town some of us may receive a pretty nest, or fancy basket, of candy eggs. Let us see if we can make some Easter eggs ourselves.

We might weave a little basket, or doll's hamper, as described on page 897. In it we might put strips of torn white or pink tissue-paper. The eggs to go in the little basket are real ones, well washed, and then, to make them firm, boiled for about 10 minutes in a saucepan of water colored in some way. A few drops of cochineal will turn the water red and color the eggs. Spinach water will turn them green; water in which onions were boiled, yellow. We can get mauve by boiling violet blossoms; blue by using washing-blue. The water and eggs are taken out of the saucepan, and the eggs are left in the water 5 minutes longer. The eggs, when colored, are carefully dried and rubbed over with a cloth dipped in sweet oil, and placed on a dish to dry. We then pack them in the basket and direct it with a message on a card.

1. An owl egg.

2. An old man egg.

Picture 2 shows a funny surprise egg for the breakfast table. All we want for it is a pen and ink to draw the face and hair, and a little cap of red Turkey twill. Easter-egg dyes may be used to decorate the eggs. Many are the faces and animals we can turn our eggs into by decorating the shell.



3. A nest of Easter eggs.

Surprise chocolate eggs are a good idea. Boys who collect eggs and know how to "blow" them will find these easy to prepare. The empty shell is stood on its broad end, and two or three drops of melted chocolate are poured through the top hole. This must dry and harden to stop up the bottom hole. Then the egg is filled up with melted chocolate. To get this we take a bar of chocolate, put it in an empty jam jar, and stand it in a pan of boiling water until the chocolate is melted, and can pass, by a funnel, through the hole in the egg. A little white sugar will cover up the dark spot, and great will be the surprise when the egg is cracked at table.

The owl shown in picture 1 is a surprise egg of this kind, with little disks of crinkled paper for the eyes, a peak behind for the head, and two pieces for wings, all of which are stuck on with a drop or two of gum. The feet are of bent wire, which is also neatly bent into the form of a ring, in which the egg stands.

We might make four surprise chocolate eggs and put them in a nest—not a real bird's nest, but one we can make ourselves. We first get some twigs and twist them together in the form of a nest—of course *ten* fingers can do what *two* small bills can do. A little glue will secure the twigs in place, and between them we arrange some real or artificial moss. Failing that, we can color some green, or shred a little green crinkled paper. Pad the nest with little bits of cotton batting and a downy feather or two, and then it is ready for the eggs, as shown in picture 3. A small basket, deep or shallow, is a good substitute for a nest.

A surprise egg might have a filling of confectioner's sugar, which is pure and wholesome. Take some confectioner's sugar and dissolve it in a few drops of cold water so that it will run through the small hole in the shell and fill the egg. Then place the egg in boiling water a few minutes to harden it. The icing can be made pink by adding to it a drop or two of cochineal.

A novel idea is to shape an egg out of dates coated with chocolate or confectioner's sugar or both. We take three large, perfect dates, and having broken them open lengthwise and taken out the stones, press the fruit together into as compact an egg shape as possible. Their stickiness will keep the dates together. We then dip them in melted chocolate several times till they are well coated, and cover them with icing. Two tablespoons will be of much help to us in getting the egg shape.

The pretty eggs in the shops are not always fit to eat, but the delicious little eggs shown in picture 4 are made of marzipan and sponge-cake. We get ¼ pound of ground almonds, ¼ pound of white powdered sugar, and 1 crumbled and sifted stale sponge-cake. We put these into a bowl, and mix them with 1 egg and a few drops of essence of almonds, using a fork first, and then the fingers, and tasting the mixture to see that the flavoring is right. We then take a lump and shape it into the form of an egg in the palm of the hand. No cooking is needed, but the marzipan is better for being kept a day. If we want the eggs very white, we can coat them over with a little icing, made by moistening some confectioner's sugar with a little cold water—only a drop or two. The eggs must be set to dry and harden in a warm place. These little eggs will look nice if they are put into a cornucopia of brown paper tied round with narrow yellow ribbon.

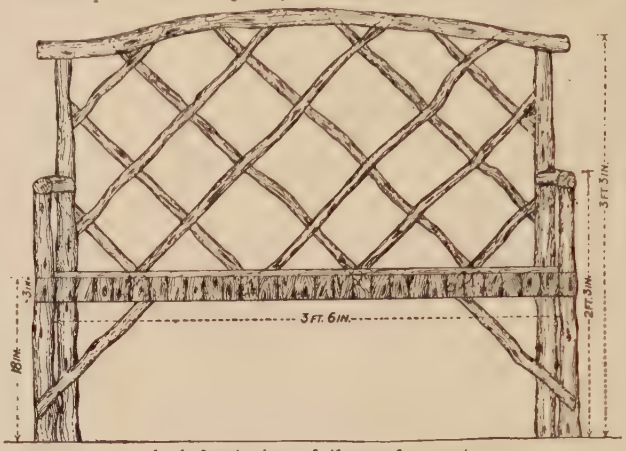
4. Marzipan eggs.

We can make an Easter egg out of the marzipan alone and can decorate it with chocolate or colored icing.

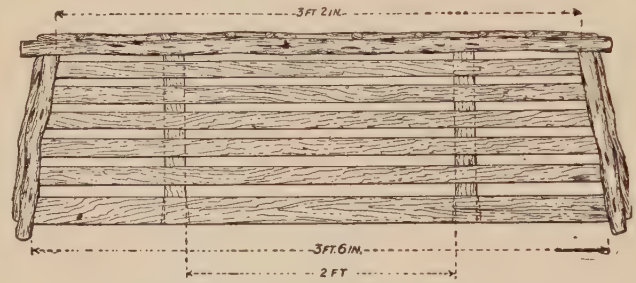
MAKING A GARDEN SEAT

A GARDEN seat is an object that can be made indoors at any time, in readiness for summer use on lawn or garden. It is very easily made and affords scope for various pretty designs, especially in rustic work, the materials for which can be obtained from a carpenter's shop or a neighbor'swood-yard. A pretty seat may also be made wholly of slats, or thin strips, on a framework of wood or of iron. Out of several designs one is selected and illustrated in this article.

Pictures 1, 2 and 3 illustrate a seat in which rustic work is combined with a square framing. Picture 1 is a view looking from the front, picture 2 shows it as one looks down upon it from above, and picture 3 is an end view.



1. A front view of the garden seat.



2. The garden seat as seen from above.

This style of seat is selected because it is easier to make than one in which the framing is built of crooked pieces of timber. With squared wood one has no difficulty in getting the essential framing level, square and strong, and we would have difficulty should we attempt to mortise and tenon or nail pieces of wood of all shapes together.

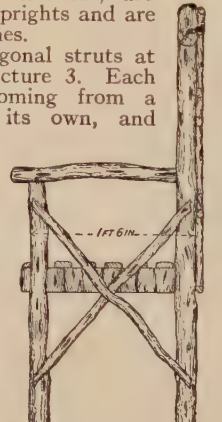
For the framing, which is seen in picture 4, we buy what is termed "quartering," measuring 3 inches deep by 2 inches wide in cross section, which saves us the trouble of sawing it out of planks. We smooth it over with a plane and cut off lengths as shown, which, of course, we may make longer or shorter as we please. The method of fitting only is important. There are two sides, two ends and two middle stretchers.

The framing for the seat has to be fitted to four uprights, which can be made of quartering or of fir-pole, as shown in the pictures. The fitting of these must be good, or the seat will be unsteady. At 18 inches from the bottom, flat faces will be cut on the uprights at right angles with each other, and on these mortises will be marked and cut, as shown in picture 4. Tenons will be cut on the ends of the seat quarterings to fit these mortises very tightly. The end of each tenon will terminate at an angle of 45° termed a mitre. These ends will abut within the legs, and this abutting contributes very much to the steadiness of the fitting. The legs of kitchen tables are fitted in exactly the same way. After being fitted, the tenons and mortises are well brushed with white-lead paint, driven in tightly and well screwed or nailed. Previous to this the central stretchers will have been fitted into place and wedged as shown. This completes the only troublesome part of the work. The remainder can be made of rustic material in any way we may desire.

Two pairs of sloping pieces, or angle-struts, are shown supporting the middle part of the seat in picture 1. These are nailed to the front and back pieces of quartering and to the legs. Elbow-rests, as seen in picture 3, formed of round poles, each being slightly flattened on one side, are tenoned into the back uprights and are nailed upon the front ones.

We must also fit diagonal struts at the ends, as seen in picture 3. Each resists the pressure coming from a direction opposite to its own, and thus renders the seat as steady as a rock. They are made of rustic branches cut to angles of 45° at the ends, and nailed or screwed, preferably the latter, to the legs.

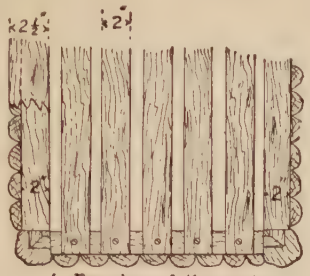
The back can be made of a crooked branch, not necessarily of the shape shown, and nailed or tenoned to the back uprights. It will be stiffened by the crossing rustic



3. The end of the seat.

work at the back, the appearance of which may not be just like the drawing, but will depend on the shapes of the material we can procure. These may be nailed or screwed, but screwing always makes a firmer job.

The seat is made of six slats of ½-inch or ¾-inch board, which may be purchased cheaply at the sawmill, or they can be sawn out of matchboarding. Oak is best, but pine will do. They are nailed with openings between to allow the rain to run away, and are slightly rounded on the top for the same reason. Here the essential work of the seat is finished. But its rustic appearance may be much improved by nailing short lengths of half-rounds all around the edges of the quartering, as shown in the pictures. They will extend from the top of the slats to about 1 inch below the quartering. Or if straight pieces of half-round branches can be procured, these can be used with good results, one in front, one at back, and one at each end. They are very much less troublesome to fit than the smaller upright pieces.



4. Framing of the seat.

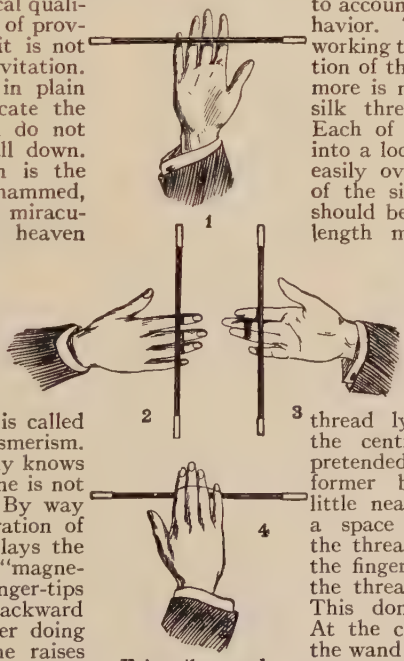
The whole seat may be painted any suitable color, but a clear varnish, applied with a brush, is preferable, as this leaves the wood its natural color. The grain of the wood can then be seen.

THE SELF-SUSPENDING WAND

THE young conjurer has seen on page 3380 how to make a magic wand and to produce it, in a magical way, from his purse. But it may not always be convenient to do this. He may not have the right sort of purse, or his purse may be so full, say, at Christmas time, as to leave no room for the wand. In such a case he may be glad to be able to give some other proof of its magical qualities, and one very good way of proving them is to show that it is not subject to the law of gravitation. These are big words, but in plain language they merely indicate the familiar truth that, if you do not hold a thing up, it will fall down. The only known exception is the coffin of the prophet Mohammed, which was said to hang, miraculously suspended, between heaven and earth. Even that tale is not true; but, anyhow, the young conjurer can work a similar miracle on a humble scale with the aid of his magic wand.

A good way of introducing the trick is to make a few remarks about what is called "animal magnetism," or mesmerism. This is a subject that nobody knows very much about, so that one is not likely to be contradicted. By way of giving a practical illustration of his miracles the performer lays the wand upon the table and "magnetizes" it by drawing the finger-tips of the right hand lightly backward and forward along it. After doing this for a few moments he raises the hand. The wand comes with it, as shown in the first picture, as if held up by some magnetic force. He waves the hand about, but, to the astonishment of the onlookers, the wand does not fall.

Tilting it into an upright position, as shown in picture 3, he removes the second and third fingers, leaving it in contact with the fore and little fingers only. Thence he transfers it to the left hand, and, to make the matter still more surprising, shows that it will hang just as well from the backs of the fingers, as shown in picture 2. After a minute or two he pretends to feel that the magnetic influence is getting weaker, and presently the wand falls to the ground. He picks it up and offers it for examination, but the closest inspection fails to discover anything to account for its very surprising behavior. There are various ways of working the trick, but for the production of the effects described, nothing more is needed than a bit of black silk thread about 7 inches long. Each of the ends must be formed into a loop, of such a size as to slip easily over the wand. The length of the silk between the two loops should be about 4 inches; the exact length most suitable will depend upon the size of the performer's hand, and must be ascertained by experiment. To prepare the wand for use, the two loops are passed over it and drawn apart, the intermediate portion of the thread lying straight along it at the centre. Under cover of the pretended magnetizing the performer brings the two loops a little nearer together. This makes a space between the wand and the thread, and presently he works the fingers of the right hand under the thread, as shown in picture 4. This done, all the rest is easy. At the close he has only to draw the wand through the hand, thereby sliding off the thread, which may be allowed to drop on the floor.



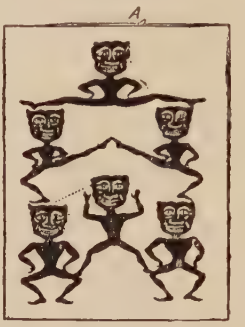
Using the wand.

At a distance of three or four feet the thread, by artificial light, is quite invisible, and no one among the audience would be able to detect it. The performer must, however, always take great care to keep the two loops on the black portion of the wand, and the back of the hand turned away from the spectators, in order to insure success.

THE IMP WITH A DISAPPEARING HEAD

THE apparatus for this trick consists of a card measuring about 4 inches by 3 inches, representing 6 little imps, as shown in picture 1.

You explain to the company that this card, which you carelessly show back and front, represents the celebrated troupe of Hikickalorum acrobats giving their marvelous performance. "You will notice their little feet," you may observe. "I will now show you their great feat, which you will find even more worthy of admiration. The two gentlemen in the middle row will kick off the head of the single gentleman just below them. If you have good sight, and watch them carefully, you will see their legs move."



1. First position of card.

Holding the card between the second finger and the thumb, the picture side facing the company, you give it a quick wave from right to left and back again. The spectators will *not* see the legs move, though some of them will probably persuade themselves they did so; but, anyhow, there is "no deception" as to the main effect promised. The head of the figure indicated has miraculously vanished, and the picture appears now as shown in picture 2.

Of course, it would not do to leave the unfortunate imp in this headless condition. You explain that his head has been kicked up into the air, where it is still floating somewhere. "I will endeavor to catch it for him," you say, "or, rather, I will let the owner catch it for himself." Holding the card as before, you give it this time a quick up-and-down movement. If you are clever, the spectators have never lost sight of the figures, but somehow the head is back again as at first.

The picture, though it is to all appearance a simple piece of card, is in reality a very ingenious piece of mechanism. The supposed card is, in fact, two cards, joined together round the edges. Between them works a little lever of sheet-brass, with its outer end projecting at the top of the picture, as shown at *A*. The "head" is movable, working on three bits of fine white horse hair, as indicated by the dotted lines. These are, by artificial light, imperceptible at a few feet distance. When *A* is as shown in picture 1, the head is in its normal position, but if *A* be pushed over as shown in picture 2, it is drawn over that of the imp in the lower left-hand corner, which it exactly covers, and so has apparently disappeared off the card.

2. Second position of card.

The working of the trick will now scarcely need explanation. Under cover of the sideways movement the performer shifts the lever to the position shown in picture 2, and the head is gone. Under cover of the vertical movement he shifts it back again, and the head returns.

The cost of the card, from almost any conjuring shop, is not very great. The secret of success in this trick is not to do it too slowly or someone will see the head come back.

FINDING OUT HOW MILK IS HANDLED

HAVE you wondered how much care is taken in handling the milk we use each day? The early methods of handling milk and the processes now used commercially indicate but little change during recent years. However, the emphasis is now chiefly upon securing more sanitary conditions in the dairy as well as wherever milk is being handled. Modern dairy methods are found to differ from the old ones mainly in this demand for better sanitation. To-day it is well known that impurities in milk often result while it is being taken from the cow. Pure milk can be had only from clean, healthy cows in well-drained, well-ventilated stables. Perhaps you have noticed milk houses separated from the stables in order that any danger of contamination may be lessened. Then, too, milking machines are being used more and more. Also, those employed for this work are usually required to have absolute cleanliness of body and clothing.

In the most modern dairies utensils are sterilized before being used. The manufacturers of dairy utensils are now more inclined to make their utensils so that greater cleanliness can be secured. The milk which is delivered for use in your home is thoroughly sterilized and poured into bottles which are of the same temperature as the milk itself. Such bottles are not only cleaned by hot water or steam, but they are sealed just as soon as the milk is poured into them. As bacteria enter milk from the air or from various articles with which it comes into contact, it is found best to check them by having the milk placed in cold or hot temperatures. You may make certain of the purity of the milk used in your home by sterilizing it to kill any bacteria which may cause poisons to form in the milk as well as cause it to sour. This sterilizing process consists of heating the milk until it scalds, which checks the growth of all bacteria.

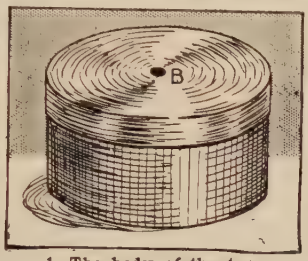
Men in the Borden factories, which were the first ones to condense milk successfully, test the milk for temperature and flavor before it is weighed. They next run it into large tanks where it is mixed with sugar. The mixture of milk and sugar is then put into vacuum pans and condensed. The discovery of the condensing process by Mr. Borden, in 1856, is of great importance, for it has made possible a form of prepared milk which is not only

strictly pure but also will keep for an indefinite period. In all factories for condensing milk, higher standards and careful inspection have helped to insure its purity. It is usually required that employees have good health, clean personal habits, and wear sterilized garments. In recent years it has been demanded that dairymen keep their dairies open for public inspection to assure greater cleanliness of cows and dairy buildings.

MAKING A WONDERFUL TOP

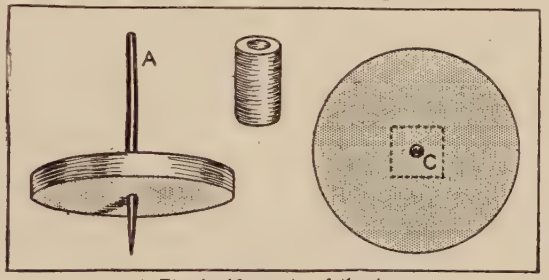
A MAGNETIC top is a very amusing and interesting toy, and can easily be made by any clever boy or girl.

First of all we need the cover of a small can such as baking-powder, coffee and other household foods are packed in. It should be about 2 or 2½ inches in diameter. Then we need a round cardboard box of the same diameter as the tin from which we took the cover, so that the cover will fit on to it tightly. Now we must carefully cut off a part of the round cardboard box so that it stands about 1½ inches high. In the middle of the tin cover we punch a small clean hole, 3/16 inch in diameter. We now put the cover on the section of the box that we cut off, so that this part of our toy appears as in picture 1.



1. The body of the top.

Next we must get a round, smooth disk of heavy wood, about 1¾ inches in diameter and ⅜ or ½ inch thick. In the centre we bore a hole, and through the hole we pass a small iron rod, so that it will fit very tight, and not move up or down in the hole. This iron rod should be a trifle more than ⅛ inch in diameter and should be sharpened to a smooth point at one end. The rod must now be magnetized. This can be done by passing a strong magnet along the rod again and again in one direction.



2. The inside parts of the top.

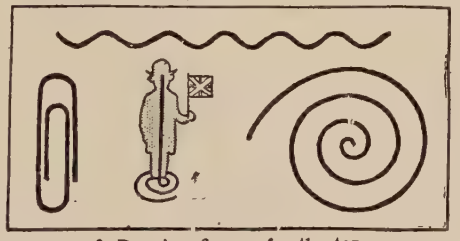
Anyone who deals in electrical appliances would magnetize the rod. The rod is put through the hole in the disk so that the point projects on one side for about ⅜ inch, and the whole forms a little top, as seen on the left of picture 2.

We must next prepare a bottom for the section of cardboard box on which we have placed a tin cover. This bottom should be of cardboard, and the bottom of the original box from which we cut our section will do very well. We cut two round pieces of thick strawboard a little smaller than this. One of these pieces is fastened firmly with glue to the bottom which we are preparing; then place on the centre a small piece of tin about ½ inch square. On top is glued the other piece of strawboard, and, with a steel punch, a hole is made through the centre of the top disk of strawboard and the punch is struck hard enough to make a dent in the tin. This dent will form a little cup for the top to spin in. The bottom of the box ready for use is shown on the right of picture 2, the tin under the strawboard being indicated by dotted lines.

One other thing we need, and that is a small piece of wooden or stiff-card tubing, about ¾ inch high, and ¼ inch diameter inside. Take the top and place over the handle the tubing. Now we put the top inside the box, with the handle sticking through the hole *B*. Holding the box upside down with the top in it, we place the bottom which we have prepared in position, so that the hole *C* punched in the strawboard is over the point of the top, and the point rests in the dent, or cup, in the square of tin.

Holding this bottom on firmly, we turn the box up the other way, and give the handle of the top, which will stick out at the top of the tin cover, a few twists to see that it spins easily and evenly in the little tin cup at the bottom. If it does all that is necessary, we now stick the bottom into the box with strips of paper. We may next paste round our box a piece of ornamental colored paper or black leatherette, to give a tidy appearance, and the top is ready.

But to get interest and amusement out of our top we need some thin steel or iron wire. This we cut into short lengths, and, with a pair of pliers, twist it into different shapes. Then, spinning the top by the handle that projects, we place against the twisting handle a piece of wire shaped like that at the top of picture 3. The wire moves backward and forward again and again across the tin top of the box. The length of wire, when twisted, should be about 2½ inches. We can form a spiral of wire, as on the right of picture 3. On the left of this picture is shown another form for the wire, and we also see a little man with a flag, cut out of paper and stuck to a bent piece of steel or iron wire with a round base.



3. Dancing figures for the top.

DOLLS OF MANY NATIONS

PLAYMATES OF OTHER LANDS, AND HOW TO DRESS THEM

WE all know that our little friends in other lands do not dress as we do, and the colored picture shows us the kind of clothes they wear. We should be able to tell whether a country were warm or cold if we saw the children dressed, because those who live in the cold place would be well wrapped up in thick woolen cloth, while the children in the warm climate would wear thin muslin or cotton stuff, and very likely have bare feet.

In hot countries the sun is so strong that it scorches the skin, so we should find the children had very brown complexions—quite a deep, rich color compared with those who live in colder climates. Generally speaking, in a hot country the hair of the people will be dark, while in a cooler atmosphere the people will be fair. For instance, in India they have black hair; while in Sweden and Norway most of them are fair, and have yellow hair.

There are differences in manners and customs as well as in faces and hair. In some countries the people are far more industrious than in others—generally in the colder ones.

Don't you know how you feel more inclined to work hard on a sharp, frosty morning than on a hot August day? Well, the cold and hot climates have exactly the same effect on the people who live there.

We are going to suppose that we have twelve dolls, and that we want to dress each one to represent one of our little friends in other lands. First, we shall find out exactly how to dress a doll like a little French child.

HENRIETTE—THE LITTLE FRENCH DOLL

FRENCH women are noted for their good taste in clothes, and the French girl always looks very neat, even if she is quite poor.

The rich people like to dress their children elaborately; their little frocks are most beautifully made, and often they cost a great deal of money. So we must dress the French doll very daintily, using fine blue glacé silk for the dress, with plenty of lace on the underthings—very full petticoats, with frills and frills of lace, and lots of tucks, and everything to make it look "fussy," and very full all around the skirt. Notice the long bodice and very short skirt shown in the picture, also the sash of plaid silk, with fringed ends.

French children are very often dressed entirely in plaid, and always show their knees until they are quite tall.

Observe the white socks, patent-toed kid boots (either black or putty color) buttoning up nearly to the top of the socks, and the smart little parasol. The hat is very full, and is made of lace, with a blue bow to trim it.

The doll's name is Henriette, and she would wear tiny pearl beads round her neck, or perhaps a string of little pale pink corals. She would have a gold bangle, or perhaps two, on her arms, and a bow on her hair of either black or pale blue silk ribbon.

We must choose a wax doll with a pale complexion and dark hair. In France it is the custom to allow the children to stay up late at night, often till the parents go to bed, so that we shall hardly ever find a child who has pretty rosy cheeks.

GRETCHEN—THE LITTLE GERMAN DOLL

NOW we will take a peep into Germany to try to find out what the little peasant children who live there are wearing. We shall have to go right out into the country to find a costume that differs from our own, for if we sought out the little girls and boys of Berlin and the other big German towns we should find them dressed very much like other children. Nevertheless, the peasant class differs very much, because it has a definite costume, which it wears both on work and fête days.

The most striking feature is the "Grannie" bonnet, with its straight front, quite stiff and plain, and full pouched back. Look at Gretchen's picture and you will see it. It would all be made of cotton stuff, but of two colors; the back part is white, and the stiff part which goes round the head pale blue, edged with a tiny frill of white.

When we dress our doll we must part her hair and braid it into two pigtails, fastened at the ends with small bows of red ribbon. Therefore, in choosing our doll we must see that she has long, fair hair, almost yellow in color. She should have a plump little figure and a good healthy color.

The soft white lawn blouse is cut rather low in the neck. It is full and pouches just a little over the top of the corselet belt which Gretchen wears. This is made of black velvet, and is a straight band in shape, supported by two bands going right over the shoulder. It is laced up behind.

The skirt is of cloth or cotton, and dark blue is a favorite color. We make it full and gather it into a plain band. It is put on after the blouse; and the corselet, which is a sort of waistbelt, fits neatly over the skirt-band.

The apron has no bib, but quite makes up for that by having *two* pockets, one on each side. It is made of white muslin, decorated with a frill at the bottom hem. This frill goes a little way up the sides of the apron.

The stockings are white, and the shoes either brown or black, with low heels, and of a wide, comfortable shape. The sleeves are small, finished by a small plain elbow band.

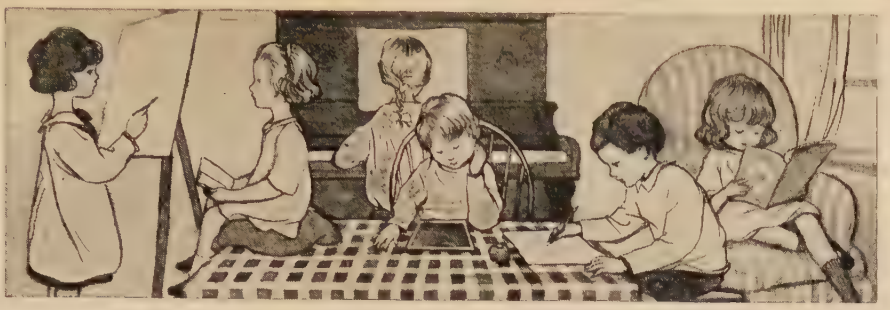
The doll's name is Gretchen, and if we liked, we might let her hold a wooden hay-rake to show that she has been at work in the fields.

On page 3627, we learn how to dress some of the other dolls.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 3625.

SOME LITTLE DOLLS OF OTHER NATIONS

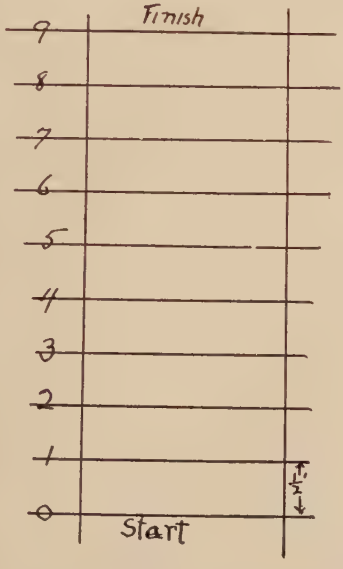
These are some of the interesting little nursery playmates of twelve other lands. The countries that these dolls come from are: Henriette—France; Gretchen—Germany; Pieter and Wilhelmina—Holland; Ivan—Russia; Greta—Sweden; Dolores—Spain; Panna—Hungary; Filomena—Italy; Chandi—India; Lotus Blossom—Japan; Sarah—Armenia; Ahweah—Eskimo.



MORE WORTHWHILE GAMES

CONTINUED FROM 3259

JUMPING AND COLUMN ADDITION GAMES—NATURE GAMES
CAFETERIA—GAMES WITH MONEY AND COMMON MEASURES



HOW far can you jump? ½ foot? 1 foot? 1½ feet? Or more? Most children of your age can surely jump half a foot, can't they? Let's plan a jumping path where we can have jumping races. Find a level place in the yard. A bare spot is best for you can draw lines with a stick in the dirt. Measure and mark the path like the picture. Make the marks half a foot apart and number them 1 2 3 4 on to 9 at the Finish. Either write the digits in the dirt with your stick or a piece of white chalk, or lay a card down by the marks.

Everybody will surely get to the Finish in nine jumps, perhaps in less than that. Who will win? The one who gets to the Finish in the fewest jumps? All right, try it that way. How many jumps did each of you take to get from the Start to the Finish?

Do you know who made the longest jump of all? You probably can't remember, but if you keep a record, you can tell. As you jump, drop a stone at the end of each jump. Or you can drop

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the stones for your playmate and he can drop them for you, and it will not bother you in your jumping. You will have a record of your jumps. You can tell how many jumps you took, and how long each of them was, and which was your very longest jump.

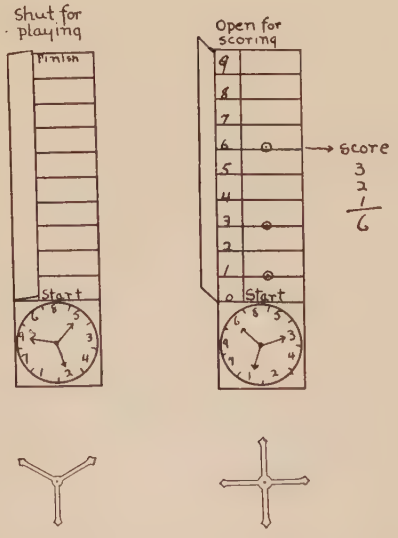
Here is another way to play. See who can jump the farthest in five jumps, or in six jumps or any number you think best. You can count your score from the stones, or you can write it down like this

2	2
2	2
1	1
1	1
	8

and add it up like this

Perhaps in three games you and your playmate score like this:

First game		Second game		Third game	
His score	Your score	His score	Your score	His score	Your score
2	2	2	2	2	2
1	2	1	1	2	1
2	1	1	1	2	2
1	2	2	1	1	2
1	1	2	2	2	2
7	8	8	7	9	9



Who wins the first game? The second? The third?

YOU can't play as hard as that all day long. Jumping is very active. You can make a quiet game with the same rules and the same way of scoring. You can play it out of doors too. I hope you do play all of your games out of doors whenever you can.

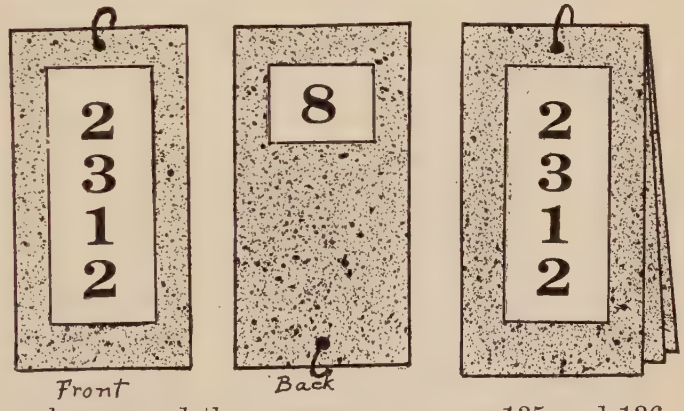
In this game you spin a spinner and it tells you how many spaces

to jump. You put your stones down wherever the spinner says, and count up your score. The picture shows you how to make your game board. You can make a spinner which will give you three turns. Then, when you can add up your scores quickly, you can make another spinner that gives you four turns.

Count up your score from your stones. Or write them 2
1
3 and add
—

them. Look under the flap to see if you are right. If you have played and scored Just Right, your last stone is by your score. If you didn't count up your score right, you lose it. You will soon learn to add the score Just Right every time. The child with the highest score wins the turn. The one with the most turns wins the game.

Your scores are in a column. You are adding columns. So this kind of adding is called column addition. If you want to know how well you can add columns, we will make up a game to find out.



You will find the columns and the answers on pages 135 and 136 of your Work Book. Put the answer on the back of the card, as in the picture, so you will see it as you turn the card up and around the ring. A good way to be sure about this is to punch your cards first, then put the column on the front with the hole at the top, turn the card over and put the answer on the back with the hole at the bottom.

First learn to play this game so that you can get the same answer that is on the back of the card, and get it every time. Then to play it for speed. Add up the column fast, and see how well you score.

NOTE TO PARENTS: It is wise not to have the children write down the answers to any of these additions where the sum is more than nine. We do not wish them to get the habit of writing down the tens, for they will not do this when they add and carry later. It is safer to write down only answers which are nine or less. It will help you to read the first book of the Thorndike Arithmetics, published by Rand McNally and Company, as you go farther with helping your children on in their numbering work. The columns for drill in the preceding game are taken from the Thorndike Arithmetics, Book One, page 13, by permission of Rand McNally and Company.

Of course you can take the cards off the ring and use them in the big wheel, or for Stop. For Stop you will need to make digit cards for 5 6 7 8 and 9.

I WONDER what games you can make up about the many things you see on your walks? You can press the leaves of different trees and mount them on cards. On the back of each card draw a picture of the fruit or write the name of the tree, so you will know what the leaf is, when you are ready to play games. Get some fruit from each of the kinds of trees, and you are ready to make up games in which you match—if you can—the leaves and the fruits.

You can get good pictures of fruits from the labels on canned fruit. These will make a third set of cards for the games.

In the summer you can do this with fruit trees like apple, peach, pear and plum, or with berry bushes like raspberry, gooseberry and currant. In the fall you can use nut trees—walnut, hickory nut, hazel nut—and such trees as the eucalyptus with its seed cups, the fir tree with its cone, the maple tree with its winged seed pods.

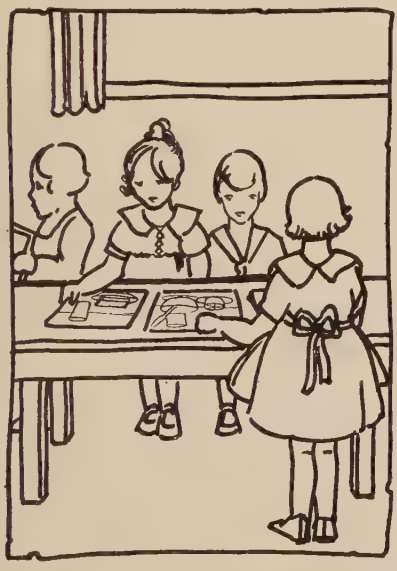
In the springtime you can easily make up vegetable games from the pictures on the seed packages. Save a few seeds from each package, and sprinkle them on the centre of a card covered with a little glue. On another card mount the picture of the plant which grows from the seed. On another card mount the picture of its leaf. On still another mount the picture of the vegetable you will eat. On the back of each card draw a picture of the vegetable or write its name, so you will know which cards belong together.

WOULD you know a butterfly if you saw it when it was an egg on a cabbage leaf? Or would you know it was a caterpillar coming out of the egg, or a big caterpillar spinning a cocoon? Would you know it when it was asleep inside its cocoon?

Would you know a frog if you saw its shiny round egg? Or would you know it when it was a tadpole with a long tail, or when its tail grew short and stumpy, or when it had no tail at all?

If you look through The Book of Knowledge you will find many interesting things about animals and everything that grows. You can then look all about you for these things and learn more for yourself. And in some of your easy reading books you will find more, and mother can read you still more about the things which interest you.

You can write stories, too. It is fun to get someone to write with you. Each choose the same thing to write about and each write the three things you think are the most interesting about it. Then read each other's stories. Perhaps you have been watching different things about you or perhaps you have been looking at different books. If so you probably will write different things and you can show each other or tell each other about the interesting things you have found.



Compare the stories you have written with the stories on pages 144 to 146 of your Work Book which six- and seven-year-old children have told. I don't know whether the children who told them could write them down or not, but you have been learning to write your stories so I think you can write as good stories as you can tell.

HAVE you weighed lately? Is your weight better than last time? Perhaps you have been playing out of doors more. Perhaps you have been eating more of the foods that make you grow.

Do you ever play cafeteria? You know a cafeteria is an eating

place where you walk along by the different kinds of food and pick out the ones that will make you a good breakfast or dinner. In the magazines there are so many nice pictures of different kinds of food. You can paste on a card the things you think would make a good meal. Mark it breakfast, or lunch, or dinner, or supper. You know some families have breakfast, lunch and dinner, and some families have breakfast, dinner and supper. Mark your cards the way your family has its meals. Make several cards. Put them out on the table and play cafeteria. Be sure your meals are all wholesome, or thoughtful people will not come to your cafeteria to eat.

Do you know how much such meals cost at a cafeteria? See if you can find out. Then write the price of each meal on the card.

If you are not sure how to write fifty cents, you can learn by the game you used on page 3126. Put pennies in one box. Put dimes in the other, for a dime is the same as a bundle of ten pennies. You can pay for ten cents worth of ice cream with a dime or with ten pennies.

You can play the game with dimes and pennies just as you did before. You wrote 5 tens and 7 ones, 57. Now you write 5 dimes and 7 pennies $.57. How much money are these?

$.45 $.68 $.23 $.37 $.76

If you have no dimes and 5 pennies you write it $.05. Then how much money are these?

$.03 $.08 $.04 $.07 $.09

You know how much money this is—$1.00. How much do you think these are?

$1.50 $1.25 $1.10 $1.05

Then, can you think out how much these are?

$2.00 $5.00 $10.00 $2.50 $5.25

NOTE TO PARENTS: I am not suggesting that the children write down the separate items and add them, as this will necessitate their putting down the digit answer under the digits and carrying tens. They are not ready for that yet, so we will avoid it by having them merely write down the approximate cost of the meal, for which they have already been prepared.

IF I have a pint of milk and you have two cupfuls, who has more? If I buy a quart of ice cream and you buy two pints of ice cream,

who has more? We have just the same, haven't we? You can prove it to yourself. Fill a pint bottle with water, and then pour the water into the measuring cup as many times as it will fill it. The pint fills the cup two times, doesn't it? And a quart of ice

cream makes two pints. If you have a quart measure or a quart bottle, see how many times it will fill a pint bottle.

Here are some things that measure the same.

1 yard is the same as 3 feet.
1 foot is the same as 12 inches.
1 quart is the same as 2 pints.
1 pint is the same as 2 cups.
1 dime is the same as 2 nickels.
1 nickel is the same as 5 pennies.
1 quarter is the same as 5 nickels.
1 dozen is the same as 12 of anything.
1 month is the same as 30 days.
1 week is the same as 7 days.
1 day is the same as 24 hours.
1 hour is the same as 60 minutes.
½ hour is the same as 30 minutes.
¼ hour is the same as 15 minutes.
½ dozen is the same as 6 of anything.
½ yard is the same as 18 inches.
¼ yard is the same as 9 inches.

THESE are measures that everybody needs to know. There are eighteen of them, so make eighteen cards to write the measure on. Put a green border around these cards. Then cut eighteen more to write the other measures that make just the same. Make a different color border to these cards. Make all of these cards long enough so you can write on them. The longest measure you have to write is "1 quarter." Practice writing that so you know how big a card it will need, and then cut all your cards that big.

You want to show which two cards belong together. You can do that by putting the same mark on the back of the green-bordered card and the other card that belongs to it. Use any marks you like. If you can't think of enough shapes that are different, use the same ones over again with a different colored crayon, until you have marked all eighteen pairs of cards differently, but each two cards in the pair must always be alike. Here are some good markers to use. I am sure you can think up many more.

You can play with these cards as in any of your matching games. Perhaps with the wheel is as much fun as any way. Or you can think of a new way you have never tried before.

Here is a new game to try. Divide the cards but put the last one in the middle. If several children are playing and there are two or three cards left over, put them in the middle too. Each child puts his pile of cards in front of him, with the writing down. When it is his turn to play, he turns up the top card. If it matches one in the middle he gets both cards. If it does not match anything there, he has to put his card in the middle. The next child takes a turn. The child who has the most cards wins the game. Each game is very short. The child wins the long game who wins the most short games.

THE NEXT HELPS TO LEARNING ARE ON PAGE 3633.

Bringing in the harvest of hay.

THE GREAT GRASS FAMILY

CONTINUED FROM 3396

THE grasses are the most important of all the plants that grow. It is doubtful if civilization could exist, or if the great variety of higher animal life found in the world to-day could have been produced without them.

Directly or indirectly, grasses form the chief food of mankind, and of the cattle, sheep and horses on which we depend for so many of the necessaries and comforts of life. A large part of the animal world to-day is made up of grass-eaters, and the carnivorous creatures live on the grass-eaters. The statement of the prophet Isaiah, "All flesh is grass," is almost literally true.

We have already seen that the great cereals—wheat, oats, barley, rye, maize, rice, millet and sorghum—are cultivated grasses. We have also seen that various other grasses are grown as forage plants. We know also that the sugar-cane, one of the most important plants outside the cereals, is a grass. It is a good thing for the world that grasses grow so freely, and that they respond to the efforts of man to improve them.

Many people who know nothing of botany seem to think that the grasses form a separate class of plants like the funguses or seaweeds, but this is not so; they are simply one of the orders, or families, of flowering plants that produce stems, leaves, flowers and seeds like the Buttercup Family or the Rose Family. The grasses form a big family, for there are between three and four thousand different species. Eight hundred or more are found in North America. Many European grasses have been introduced by accident, or intentionally.

The idea that all grasses are more or less alike is a mistaken one, for these plants are as varied in size and form and habit as the members of any other family of flowering plants.

They are wonderfully adapted to the different soils, climates and conditions in which they grow. To the casual observer our grasses look more or less alike, but when we go abroad we find some very remarkable members of the family. In India and China, for example, the great bamboos, which are grasses, reach a height of a hundred feet, and some have a stem like the trunk of a small tree, over four feet around. On some the outside covering is so hard that when the stem is struck with an ax sparks of fire are seen to fly from it as though it were a piece of flint.

Some of the many uses to which the bamboo is put in the East are mentioned on page 3154, and there are many others. From the pith of some

bamboos a sugary substance is extracted which is used for sweetening, and the seeds of other species are used in the same way as rice. From them, also, is prepared a fermented beverage, and the young shoots are eaten.

Bamboos, though generally very tall and big plants, are of exceedingly rapid growth, which adds to their value. They flourish on the mountains to a height of two miles or more above sea-level, and their graceful, drooping, feathery tops give them a very beautiful appearance.

The Climbing Grass that Blocks the Traveler's Way in Chile

How different from the bamboo is another grass found growing in Chile. This is a climbing species, and winds round and round the tall trees, hanging down from the branches in graceful festoons. It is so tangled that the traveler can hew his way through it at only a very slow rate. To travel a mile where this climbing grass abounds would take two days. Even bamboos are sometimes almost impassable, and travelers who have climbed Mount Ruwenzori, in Uganda, tell us that it takes nearly a day to pass through a comparatively narrow zone of bamboos.

Still another kind of grass, very different from the restful and useful pasture grasses, is found in various parts of the world. There are several species, and they have long, spiny points on their fruits, with a number of short, stiff hairs which enable them to make their way into the ground and keep a place there ready for germinating. As the wind blows the seed and twists it round and round, the hairs entangle themselves among the other plants, and enable the seed to get a hold from which it cannot be dislodged; the twisting works the point into the soil in the same way as twisting will work a gimlet into wood.

Grasses as Agents of Civilization and Friends of Man

When these seeds fall on the back of a sheep they become entangled in the wool, so that the sheep cannot rid itself of them. Sometimes the seed is gradually driven through the animal's skin, making a nasty wound that often causes death. There are a number of grasses growing in Russia, Australia and North America that cause the death of sheep in this way. The grasses that give life to sheep in some parts of the world have, therefore, very dangerous relatives that destroy them in other parts.

As a rule, however, the grasses are the true friends of man; and they have been great agents in the spread of civilization. They have enabled man to grow large quantities of food for the support of great populations such as are found in big cities and towns, and they provide pastures for his flocks and herds.

Grasses, like other plants, have a constant fight for existence, and structure and habits have no doubt been modified through the ages as they adapted themselves to circumstances. Perhaps the outstanding feature of a grass plant is the extreme narrowness of the stem and leaves compared with the height to which it grows.

Generally a tall factory chimney sixty feet high has a base four feet in diameter, but the stem of a grass—the rye for example—though 1,500 millimetres high, is only three millimetres in diameter at the base. In other words, man in building a chimney can make the height only fifteen, or at the outside seventeen, times the diameter of the base. Nature can set up a structure five hundred times the height of its diameter. This is really a very marvelous achievement, and means that if man could rival nature, a chimney with a base five feet in diameter could be built to a height of half a mile.

Why the Grass is able to Stand Up Stiff and Straight

A stem of grass is a wonderful structure. It is hollow in most species, though Indian corn and sugar-cane are exceptions in having solid stems. A considerable amount of silica gives the stem a stiff and wiry character which enables it to stand upright. The rain may beat it down temporarily, but as soon as the sun shines and the weather becomes dry once more, the stem often jumps up as erect as ever. Grass leaves are usually long and narrow with no stalk, but with a long sheath which is rolled round the stem. One edge overlaps the other, and is split down on the side opposite to that on which the blade is found.

The flowers occur in spikelets, or ears, and are arranged sometimes in the form of spikes, sometimes as racemes, or clusters, with the flowers attached by short equal stalks at equal distances along the central stem, and sometimes in panicles—that is, with a loose, irregular arrange-

Here our artist shows us a spike of meadow fox-tail grass as we see it with the naked eye and the flower as it looks through a magnifying lens. A glume, or husk, is shown on the point of opening, and we see the feathery stigmas (female parts), and the anthers (the parts of the male organ called the stamens, which bear the pollen).

ORCHARD GRASS

RYE GRASS

OAT GRASS

UPRIGHT BROME GRASS

WALL BARLEY

QUAKING GRASS

The Grass Family exceeds all other plant families in the number of its individual plants, and in its wide distribution over the earth. Grasses range from the Equator to Spitzbergen in the North and to the extreme tip of South America in the South. Nine out of every ten plants in the world are grasses.

TIMOTHY GRASS

MANNA GRASS

BEARDED DARNEL

TUFTED AIRA

CANARY GRASS

REED GRASS

Grasses are mostly fertilized by the wind, and in order that their pollen may be easily shaken off to be carried from plant to plant, the anthers which bear it are suspended on the most delicate filaments. The slightest breeze sets them in motion and a field of grass, or a prairie, is like the sea: it is never still.

THE COMMON REED AND PART OF ITS MANY-FLOWERED HEAD, GREATLY MAGNIFIED

A SPIKE OF COUCH WHEAT GRASS ON THE RIGHT AND THE FLOWERS MAGNIFIED ON THE LEFT

As all these pictures show, the flowers of the grasses are alike in two things, their pollen-bearing anthers are suspended on very fine supports which can be moved by the slightest wind, and their stigmas have a feather-like form, so that they may easily catch the pollen as it falls upon them.

ment like that of oats. The fruits, or grain, are filled with the seed, their coats adhering to one another; and the embryo, from which the new plant grows, lies to one side at the base of a mass of starchy endosperm, on which the young plant can feed as it develops. The character of a grass seed can be studied in a grain of wheat, and the flowers of grass are well illustrated.

The flowers of grasses are rather difficult to examine, but by means of a powerful lens they may be seen in all their detail, and are very beautiful. When walking through a meadow we scarcely notice the colors of the grass flowers, but if we examine them closely we find they consist of a mass of delicate shades of greenish blue, purple, brown and pink. Most grasses are wind-pollinated, but some, like sweet vernal grass, have been seen to be visited by flies. Grasses have three ways of multiplying—by seeds, by underground stems, or rootstocks, and by stolons, or stems, which grow along the surface.

Where land is left untended grass almost always appears. This is largely due to the fact that the young plants are so well protected. After the plant has germinated, the leaf tip projects above the earth and the plant remains in that position for a long time. The stem and ear stay underground, inclosed in a series of cylindrical sheaths which are peculiarly adapted for their duties. They are very hard and tough, and protect the young plant not only from insects and drought, but, being bad conductors of heat, they protect the plant from sudden changes in temperature. When the grass begins to grow it springs up very much as if a telescope were being opened out. Meanwhile the root is fixing itself with root-hairs in the soil, gathering nourishment, and storing this up in the bud. New buds appear within the leaf-sheaths, and in a suitable soil many stems spring from one seed, and a tussock of grass results.

Wood Melic. | Annual Meadowgrass. | Meadow Barley. | Brown Bent Grass. | Smooth Meadowgrass. | Sheep's Fescue Grass.

The leaves of grasses are wonderfully adapted to the conditions of the place where they grow. In Siberia and Argentina, for instance, they contain alternate strips, or ridges, of hard cells and of delicate cells in grooves. In dry, hot weather the delicate cells collapse and the leaf is wrapped round into a kind of cylinder, hard and uninviting to the animal that might otherwise devour it. This rolling-up of grass leaves is a very familiar feature of the plants, even in our fields, and the action is due to the presence of special cells, called motor-cells, on the upper side of the leaf.

When the air is dry and the cells are losing water rapidly they contract and draw together the adjacent parts of the leaf. Sometimes, as in meadow grass, there are two rows of motor-cells, one on each side of the midrib, and the leaf simply folds over by their contraction; but, in most cases, the leaf does not merely fold over once, but rolls up into a tube.

The average grass plant gives out its own weight of water in twenty-four hours in hot, dry weather; and it has been found that a square foot of turf will yield more than one and a fifth pints of water in that time. Long pasture grass, however, gives off much more—over four pints to the square foot, or about 106 tons to the acre.

How grass produces millions of seeds and fights for its life

The seeds of grasses vary very much in size. In wood meadow grass, for example, there are 2,330,000 seeds to the pound, in sheep's fescue 1,560,000, and in golden oat grass 1,400,000. On the other hand, tall oat grass has only 140,000 seeds to the pound, perennial rye grass 220,000, and meadow fescue 240,000. The amount of hay that different grasses produce also varies considerably. Cocksfoot grass has yielded 28,000 pounds per acre on a rich sandy loam, which when dried became 12,000 pounds. Timothy grass has given 40,000 pounds, decreasing to 17,000 when dried. On the other hand, perennial rye grass gave only 7,800 pounds an acre, or, when dry, 3,400 pounds.

In the fight for life grasses rapidly overcome other plants, as we can see on neglected garden paths and disused roadways. Various plants, like dandelions and buttercups, appear first, but in course of time grass will cover the whole area. The shafts of grass, by reason of their pointed and narrow shape and their hard texture, are able to fight their way up through any soil. Nature dislikes bare ground and wherever possible covers it with grass.

Why we should appreciate the grass that gives us cheap food

We ought to understand the part of grasses in providing us with food. Were it not for the grass pastures we should certainly have to pay very much more for our meat, milk and wool. They can be produced from pasturage more cheaply than from any other form of food. Grass dried in the sun and wind is hay, and this provides a nourishing winter food for animals; but if the grass, after being cut, lies too long exposed to sun and wind, the food value, fragrance and color are all diminished. The fragrance is important, as it makes the fodder palatable to the animals for whom it is intended. Grass to be used as hay should be cut in full vigor and bloom before any woody fibre or seed has developed. Rain falling on the cut grass does harm, as it washes out some of the soluble parts such as sugar, gum and albumin; if it lies wet for long, fermentation sets up and the sugary matter is turned into alcohol.

From the earliest times grass has been the basis of live-stock production, but it has been more than a useful friend to man: it has clothed the earth with beauty, it has softened the ravages of tempest, and earthquake, and war, and has been a symbol of peace and quiet restfulness. A famous writer has well said: "Grass is the forgiveness of Nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal."

The sedge that was used as paper in ancient Egypt

In the order to which the grasses belong there are two families. One of them is the grasses themselves and the other the sedges. Sedges are very much like grasses in appearance, but the two families may be distinguished by their stems. The grasses have stems that are round or flattened in section, while the stems of the sedges are three-cornered, or triangular. Further, the stems of sedges are usually neither swollen at the nodes where the leaves grow out, nor hollow like the grass stems. The sheaths of the grasses, too, are open, and, while gripping the stem, can be unfolded without fracture, while in sedges the edges are fastened so that the whole forms a complete tube.

Two or three thousand species of sedges are known. The papyrus of Egypt, which used to be prepared for manuscripts, is a sedge. Sedges are of little use, as only a few provide poor pasture.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 3647.

THE FIRST CANADIAN HUMORIST

THE Clockmaker; or The Sayings and Doings of Sam Slick of Slickville, first appeared in the form of articles in a paper, the Nova Scotian, beginning in 1835. The author was Thomas Chandler Haliburton, who was born in 1796 at Windsor, Nova Scotia. At the time he wrote The Clockmaker, Haliburton was a judge. Although the chief character of the book, Sam Slick, is a Yankee, the scene is Nova Scotia. This was the first time the American dialect was used in literature. The homely wit and the good common sense of Sam Slick appealed to many readers in Canada and abroad. Nova Scotians and Yankees alike were made the objects of Haliburton's shrewd satire. At one period in England this book was almost as popular as Dickens' Pickwick Papers. Of course when we read The Clockmaker we must remember that the Nova Scotia it refers to was the Nova Scotia of almost a hundred years ago. Judge Haliburton is called the first Canadian humorist.

THE CLOCKMAKER, SAM SLICK

CONTINUED FROM 3364

AN Englishman, known as the Squire, was riding a fast horse from Halifax to Fort Lawrence in the province of Nova Scotia, when he was passed on the road by a man mounted on a better animal. This stranger soon dropped back, reined in beside the Squire and began to ask most inquisitive questions. He explained that he was a Yankee clock-peddler, his name was Sam Slick, and he was from Slickville, Connecticut. The Squire found his self-invited companion was gifted with a nimble tongue and a shrewd brain. It was the stranger's delight to brag of his own country and to point out the failings of all Britishers. "Blue-noses," as the Nova Scotians were called, came in for a great share of criticism. This both amused and irritated the Squire, who, from time to time, poked fun at Sam and his boasting.

Sam knew Nova Scotia from one end to the other, for he had peddled clocks there for years. And he was always successful in selling, no matter how poor a farmer was. The Squire, who is supposed to have written the book, asks the clockmaker the secret of his success, and the following conversation takes place.

" 'What a pity it is, Mr. *Slick*' (for such was his name)—'what a pity it is,' said I, 'that you, who are so successful in teaching these people the value of *clocks*, could not also teach them the value of *time*.' 'I guess,' said he, 'they have got that ring to grow on their horns yet, which every four-year-old has in our country. We reckon hours and minutes to be dollars and cents. They do nothin' in these parts but eat, drink, smoke, sleep, ride about, lounge at taverns, make speeches at temperance meetings, and talk about *"House of Assembly."* If a man don't hoe his corn, and he don't get a crop, he says it is all owin' to the bank; and if he runs into debt, and is sued, why, he says lawyers are a cuss to the country. They are a most idle set of folks, I tell *you*.' 'But how is it,' said I, 'that you manage to sell such an immense number of clocks (which certainly cannot be called necessary articles) among a people with whom there seems to be so great a scarcity of money?'

"Mr. Slick paused, as if considering the propriety of answering the question, and looking me in the face, said in a confidential tone: 'Why, I don't care if I do tell you, for the market is glutted, and I shall quit this circuit. It is done by a knowledge of *soft sawder and human natur'*. But here is Deacon Flint's,' said he; 'I have but one clock left. I will sell it to him.' "

Sam Slick proceeded to flatter, or "soft sawder," the Deacon and his wife most openly and outrageously. In the end the clock was left there until the Clockmaker's next visit. Sam regarded the timepiece as sold, for he said to the Squire: "It isn't in human natur' to surrender it voluntarily."

In his quaint ungrammatical but expressive language Sam Slick pointed out the failings of the *Blue-noses* of that time:

" 'Depend on it, sir,' said he, with a most philosophical air, 'this Province is much behind the intelligence of the age. But if it is behind us in that respect, it is a long chalk ahead on us in others. I never seed or heerd tell of a country that had so many nateral privileges as this. Why, there are twice as many harbours and water powers here as we have all the way from Eastport to New Or*leens*. They have all they can ax, and more than they desarve. They have iron, coal, slate, grindstone, lime, firestone, gypsum, freestone, and a list as long as an auctioneer's catalogue. But they are either asleep or stone blind to them. Their shores are crowded with fish, and their lands covered with wood. A Government that lays as light on 'em as a down counterpin, and no taxes. Then look at their dykes. The Lord seems to have made 'em on purpose for such lazy folks. If you were to tell the citizens of our country that these dykes had been cropped for a hundred years without manure, they'd say they guessed you had seen Col. Crocket, the greatest hand at a flam in our nation. You have heerd tell of a man who couldn't see London for the houses; I tell you, if we had this country, you couldn't see the harbours for the shippin'. There'd be a rush of folks to it, as there is in one of our inns to the dinner-table, when they sometimes get jammed together in the doorway, and a man has to take a running leap over their heads afore he can get in. A little nigger boy in New York found a diamond worth 2,000 dollars; well, he sold it to a watchmaker for 50 cents—the little critter didn't know no better. *Your people are just like the nigger boy, they don't know the valy of their diamond.*' "

The Clockmaker pointed his wisdom with simple illustrations. To the Squire he says:

" 'When I was a boy, I was always late to school; well, father's preachin' I didn't mind much, but I never could bear to hear mother say: "Why, Sam, are you actilly up for all day? Well, I hope your airly risin' won't hurt you, I declare! What on airth is a-goin' to happen now? Well, wonders will never cease!" It raised my dander; at last says I: "Now, mother, don't say that 'are any more, for gracious sake, for it makes me feel ugly; and I'll get up as airly as any on you"; and so I did, and I soon found what's worth knowin' in this life: *An airly start makes easy stages.*' "

As the Squire and the Clockmaker continued their journey through the country, Sam became excited at the huge, rambling houses they passed.

"As we approached within fifteen or twenty miles of Parrsboro', a sudden turn of the road brought us direct in front of a large wooden house, consisting of two storeys and an immense roof, the height of which edifice was much increased by a stone foundation rising several feet above ground. 'Now, did you ever see,' said Mr. Slick, 'such a catamaran as that? There's a proper goney for you! for to go and raise such a buildin' as that 'are; and he has as much use for it, I do suppose, as my old waggon here has for a fifth wheel. Blue-nose always takes keer to have a big house, 'cause it shows a big man, and one that's considerable forehanded, and pretty well-to-do in the world. These Nova Scotians turn up their blue-noses as a bottle-nose porpoise turns up his snout, and puff and snort exactly like him, at a small house. If neighbour Carrit has a two-storey house, all filled with winders like Sandy Hook Lighthouse, neighbour Parsnip must add jist two feet more on to the post of his'n, and about as much more to the rafter, to go ahead of him; so all these long, scarce gentlemen strive who can get the furdest in the sky, away from their farms.' "

The Clockmaker went on to give an amusing account of a visit he had paid to Squire Blake at one of the big houses. He had tea with old Marm Blake. Then he continued:

" 'Well, arter tea we sot and chatted awhile about fashions, and markets, and sarmons, and scandal, and all sorts o' things: and in the midst of it in runs the nigger wench, screemin' out at the tipeend of her voice: "Oh, missus, missus! there's fire in the dairy! Fire in the

dairy!" "I'll give it to you for that," said the old lady; "I'll give it to you for that, you good-for-nothin' hussy. That's all your carelessness. Go and put it out this minit. How on airth did it get there? My night milk's gone, I dare say. Run this minit and put it out, and save the milk!" I am dreadful afeard of fire; I always was, from a boy; and seein' the poor, foolish critter seize a broom in her fright, I ups with the tea-kettle and follows her, and away we clipt thro' the entry, she callin' out "Mind the cellar-door on the right!" "Take keer of the clo's-horse on the left!" and so on; but as I couldn' see nothin', I kept right straight ahead. At last my foot kotched in somethin' or another that pitched me somewhat less than a rod or so, right agin the poor black critter, and away we went heels over head. I heerd a splash and a groan, and I smelt somethin' plaguy sour, but couldn' see nothin'. At last I got hold of her, and lifted her up (for she didn't scream, but made a strange kind of chokin' noise), and by this time up came Marm Blake with a light. If poor Beck didn't let go then in airnest, and sing out for dear life, it's a pity; for she had gone head first into the swill-tub, and the tea-kettle had scalded her feet. She kept a-dancin' right up and down like one ravin', distracted mad, and boo-hooed like anything, clawin' away at her head the whole time to clear away the stuff that stuck to her wool.

"'I held in as long as I could, till I thought I should have busted (for no soul could help a-larfin'), and at last I haw-hawed right out. "You good-for-nothin', stupid slut, you!" said the old lady to poor Beck. "It sarves you right; you had no business to leave it there. I'll pay you." "But," said I, interferin' for the unfortunate critter, "good gracious, marm! you forget the fire." "No, I don't," said she; "I see him!" and seizin' the broom that had fallen from the nigger's hand, she exclaimed, "I see him! the nasty varmint!" and began to belabour most onmercifully a poor, half-starved cur that the noise had attracted to the entry. "I'll teach you," said she, "to drink milk; I'll larn you to steal into the dairy," and the besot critter joined chorus with Beck, and they both yelled together till they fairly made the house ring agin. Presently old Squire Blake popt his head out of a door, and rubbin' his eyes, half-asleep and half-awake, said, "What's the devil to pay now, wife?" "Why, nothin'," says she; "only *Fire's in the dairy*, and Beck's in the swill-tub, that's all." "Well, don't make such a touss, then," said he, "if that's all," and he shut-to the door, and went to bed agin. When we returned to the keepin'-room, the old lady told me that they always had had a dog called *Fire* ever since her grandfather, Major Donald Fraser's time. "And what was very odd," says she, "everyone on' 'em would drink milk if he had a chance."

"'By this time the shower was over, and the moon shinin' so bright and clear, that I thought I'd better be up and stirrin'; and arter slippin' a few cents into the poor nigger wench's hand, I took leave of the grand folks in the big house. Now, Squire, among these middlin'-sized farmers you may lay this down as a rule: *The bigger the house, the bigger the fools be that's in it.*

"'But, howsomever, I never call to mind that 'are go in the big house up to the right that I don't snicker when I think of *Fire in the dairy.*'"

How the Squire and the Clockmaker, who seemed to like each other's company, passed the time on their travels through the country can be read in the following chapter from the book itself.

TWO KINDS OF FARMERS

WE left Gasperaux early in the morning, intending to breakfast at Kentville. The air was cool and bracing. The sun, which had just risen, shed a lustre over the scenery of this beautiful and fertile valley, which gave it a fresh and glowing appearance. "A splendid country this, Squire," said the Clockmaker; "that's a fact. The Lord never made the beat of it. I wouldn't ax no better location in the farmin' line than any of these allotments—grand grazin' grounds and superfine tillage lands. A man that know'd what he was about might live like a fightin' cock here; and no great scratchin' for it, neither. Do you see that 'are house on that risin' hummock to the right there? Well, jist look at it. That's what I call about right. Flanked on both sides by an orchard of

best grafted fruit; a tidy little clever flower-garden in front, that the gals see to; and a'most a grand sarce garden over the road there sheltered by them 'are willows. At the back-side, see them everlastin' big barns! And, by gosh! there goes the dairy cows—a pretty sight too, that fourteen of them marchin' Indgianfile arter milkin', down to that 'are medder. Whenever you see a place all snugged up and lookin' like that 'are, depend on it the folks are of the right kind. Them flowers too, and that 'are honeysuckle and rose-bushes, show the family are brought up right; sunthin' to do at home, instead of racin' about to quiltin' parties, huskin' frolicks, gossipin', talkin' scandal, and neglectin' their business. Them little matters are like throwin' up straws; they show which way the wind is. When gals attend to them 'are things, it shows they are what our ministers used to call 'right-minded.' It keeps them busy—and when folks are busy, they han't time to get into mischief—and it amuses them too, and it keeps the dear little critters healthy and cheerful. I believe I'd alight and breakfast there, if you've no objection. I should like you to see that citizen's improvements; and he's a plaguy nice man too, and will be proud to see you, you may depend."

We accordingly drove up to the door, where we were met by Squire James Horton, a respectable, intelligent, cheerful-looking man, apparently of about fifty years of age. He received me with all the ease and warmth of a man to whom hospitality was habitual and agreeable; thanked Mr. Slick for bringing me to see him; and observed that he was a plain farmer, and lived without any pretensions to be other than he was, and that he always felt pleased and gratified to see any stranger who would do him the favour to call upon him, and would accommodate himself to the plain fare of a plain countryman. He said he lived out of the world, and the conversation of strangers was often instructive, and always acceptable to him. He then conducted us into the house, and introduced us to his wife and daughters—two very handsome and extremely interesting girls, who had just returned from superintending the operations of the dairy. I was particularly struck with the extreme neatness and propriety of their attire, plain and suitable to their morning occupations.

As the clock struck seven (a wooden clock, to which Mr. Slick looked with evident satisfaction as a proof of his previous acquaintance), the family were summoned, and Mr. Horton addressed a short but very appropriate prayer to the Throne of Grace, rendering the tribute of a grateful heart for the numerous blessings with which he was surrounded, and supplicating a continuance of divine favour. There was something touching in the simplicity and fervour of his manner, and in the unpretending style of his devotion, while there was a total absence of that familiar tone of address so common in America, which, often bordering on profanity, shocks and disgusts those who have been accustomed to the more decorous and respectful language of our beautiful liturgy.

Breakfast was soon announced, and we sat down to an excellent and substantial repast—everything abundant and good of its kind, and the whole prepared with a neatness that bespoke a well-regulated and orderly family. We were then conducted round the farm, and admired the method, regularity, and good order of the establishment. "I guess this might compare with any of your English farms," said the Clockmaker. "It looks pretty considerable slick this, don't it?" "We have great advantages in this country," said Mr. Horton. "Our soil is naturally good, and we have such an abundance of salt sludge on the banks of the rivers that we are enabled to put our uplands in the highest state of cultivation. Industry and economy can accomplish anything here. We have not only good markets, but we enjoy an almost total exemption from taxation. We have a mild and paternal government; our laws are well and impartially administered, and we enjoy as much personal freedom as is consistent with the peace and good order of society. God grant that it may long continue so, and that we may render ourselves worthy of these blessings by yielding the homage of grateful hearts to the great Author and Giver of all good things." A bell ringing at the house at this time reminded us that we were probably interfering with some of his arrangements, and we took leave of our kind host, and proceeded on our journey, strongly impressed with those feelings which a scene of domestic happiness and rural felicity like this never fails to inspire.

We had not ridden more than two or three miles before Mr. Slick suddenly checked his horse, and pointing to a farm on the right-hand side of the road, said: "Now, there is a contrast for you, with a vengeance. That critter," said he, "when he built that wrack of a house—they call 'em a half-house here—intended to add as much more to it some of these days, and accordin'ly put his chimbley outside to sarve the new part as well as the old. He has been too lazy, you see, to remove the bankin' put there, the first fall, to keep the frost out o' the cellar; and it has rotted the sills off, and the house has fell away from the chimbley, and he has had to prop it up with that great stick of timber to keep it from comin' down on its knees altogether. All the winders are boarded up but one, and that has all the glass broke out. Look at the barn! The roof has fell in in the middle, and the two gables stand starin' each other in the face, and as if they would like to come closer together if they could, and consult what was best to be done. Them old geese and vet'ran fowls, that are so poor the foxes won't steal 'em for fear o' hurtin' their teeth; that little yaller, lantern-jaw'd, long-legg'd, rabbit-eared runt of a pig, that's so weak it can't curl its tail up; that old frame of a cow, a-standin' there with his eyes shot to, a-contemplatin' of its latter eend; and that varmint-lookin' horse, with his hocks swelled bigger than his belly, that looks as if he had come to her funeral, is all his stock, I guess. The goney has showed his sense in one thing, however: he has burnt all his fence up; for there is no danger of other folks' cattle breakin' into his field to starve, and gives his old Mooley a chance o' sneakin' into his neighbours' fields o' nights if she find an open gate, or a pair of bars down, to get a treat of clover now and then. Oh, dear! if you was to get up airly of a mornin' afore the dew was off the ground, and mow that 'are field with a razor, and rake it with a fine tooth-comb, you wouldn't get stuff enough to keep one grasshopper through the winter, if you was to be hanged for it. S'pose we drive up to the door to light a cigar? If Nick Bradshaw is to home, I should like to have a little chat with him. It's worth knowin' how he can farm with so little labour; for anything that saves labour in this country is worth larnin', you may depend."

Observing us pause and point towards his domain, Nicholas lifted off the door and laid it on its side, and emerging from his den of dirt and smoke, stood awhile reconnoitring us. He was a tall, well-built, athletic-looking man, possessed of great personal strength and surprising activity, but looked like a good-natured, careless fellow, who loved talking and smoking better than work, and preferred the pleasures of the tap-room to the labours of the field. "He thinks we want his vote," said the Clockmaker. "He's looking as big as all out-doors jist now, and is waitin' for us to come to *him*. He wouldn't condescend to call the king his cousin jist at this present time. It's Independent day with him, I calculate. Happy-lookin' critter, too, ain't he, with that 'are little, short black pipe in his mouth? The fact is, Squire, the moment a man takes to a pipe, he becomes a philosopher. It's the poor man's friend; it calms the mind, soothes the temper, and makes a man patient onder trouble. It has made more good men, good husbands, kind masters, indulgent fathers, and honest fellers than any other blessed thing in this univarsal world. The Indgians always buried a pipe and a skin of tobacco with their folks, in case smokin' should be the fashion in the next world, that they mightn't go onprovided. Jist look at him! His hat has got no crown in it, and the rim hangs loose 'a one side like the bale of a bucket; his trousers and jacket are all flyin' in tatters of different-coloured patches. He has one old shoe on one foot, and an ontanned moccasin on t'other. He ain't had his beard cut since last sheep-shearin', and he looks as shaggy as a yearlin' colt. And yet you see the critter has a rakish look, too. That 'are old hat is cocked on one side quite knowin'. He has both hands in his trousers'-pockets, as if he had somethin' worth feelin' there; while one eye shot to on account of the smoke, and the other standin' out of the way of it as far as it can, makes him look like a bit of a wag. A man that didn't smoke couldn't do that, now, Squire. You may talk about fortitude, and patience, and Christian resignation, and all that 'are sort of thing, till you're tired—I've seen it, and heerd tell of it too—but I never knew an instance yet where it didn't come a little grain heavy or sour out of the oven. Philosophy is like most other

guests I've seed; it likes to visit them as keeps good tables, and though it has some poor acquaintances, it ain't more nor half-pleased to be seen walkin' lock-and-lock with 'em. But smokin'— Here he comes, tho', I swan. He knows Old Clay, I reckon. He sees it ain't the candidate chap."

This discovery dispelled the important airs of Nicholas, and taking the pipe out of his mouth, he retreated a pace or two, and took a running leap of ten or twelve feet across a stagnant pool of green water that graced his lawn, and served the double purpose of rearing goslings and breeding moschetoes, and by repeating these feats of agility on the grass several times (as if to keep himself in practice) was by the side of the waggon in a few minutes.

"Mornin', Mr. Bradshaw!" said the Clockmaker. "How's all at home to-day?" "Reasonable well, I give you thanks. Won't you alight?" "Thank you; I jist stop to light a cigar." "I'll bring you a bit o' fire," said Nick, "in the twinklin' of an eye," and bounding off to the house with similar gigantic strides, he was out of sight in a moment. "Happy, good-natured citizen that, you see, Squire," said Mr. Slick. "He ain't been fool enough to stiffen himself by hard work, neither; for you see he is as supple as an eel. The critter can jump like a catamount, and run like a deer; he'd catch a fox a'most, that chap."

Presently out bounded Nick in the same antelope style, waving over his head a lighted brand of three or four feet long. "Here it is," said he. "But you must be quick, for this soft green wood won't hold in fire no time; it goes right out. It's like my old house there, and that's so rotten it won't hold a nail now; after you drive one in, you can pull it out with your fingers." "How are you off for tobacco?" said Mr. Slick. "Grand," said he; "got half a fig left yet. Get it for you in a minit; and the old lady's pipe too," and without waitin' for a reply, was curvetting again off to the house. "That goney," said the Clockmaker, "is like a gun that goes off at half-cock; there's no doin' nothin' with him. I didn't want his backey; I only wanted an excuse to give him some. But it's a strange thing that, Squire, but it's as sure as rates, *the poor are everywhere more liberal, more obligin', and more hospitable, accordin' to their means, than the rich are.* They beat them all holler; it's a fact, I assure you."

When he returned, Mr. Slick told him that he was so spry, he was out of hearing before he could stop him; that he didn't require any himself, but was going to offer him a fig of first-chop, genuine stuff he had. "Thank you," said he, as he took it, and put it to his nose. "It was the right flavour that; rather weak for me, tho'. I am thinkin' it'll just suit the old lady; she smokes a good deal now for the cramp in her leg. She's troubled with the cramp sometimes, away down somewhere about the calf; and smokin' they say, is good for it."

He then took the tobacco very scientifically between the forefinger and thumb of his left hand, and cut it into small shreds that fell into the palm; then holding both knife and fig between his teeth, he rolled, untwisted, and pulverised the cut tobacco by rubbing and grinding it between his two hands, and refilled and lighted his pipe, and pronouncing the tobacco a prime article, looked the very picture of happiness. "How's crops in a gineral way this year?" said Mr. Slick. "Well, they are jist about meddlin'," said he. "The seasons han't been very good lately, and somehow the land don't bear as it used to when I was a boy. But I'm in great hopes times are goin' to be better now. They say things look brighter; *I feel a good deal encouraged myself.* They tell me the Governor's a-goin' to appoint a new council; I guess they'll do sunthin' for the country." "Ah," said the Clockmaker, "that, indeed! That would be sunthin' like. It would make things quite brisk agin. Farmers could afford to live then. It would raise markets considerable." "So I see in the papers," said Nick. "The fact of the matter is, the Assemblymen must do sunthin' for the country, or it will go to the dogs; that's sartain. They tell me, too, that the Council doors are to be opened, so that we can hear the debates. That will be a great privilege, won't it?" "Very," said the Clockmaker. "It will help the farmer amazin'ly that; I should count that a great matter. They must be worth hearin', them councillors. It's quite a treat to hear the members in the House, particularly when they talk about bankin', currency, constitution, bounties, and such tough, knotty things; they go so

deep into these matters, and know so much about 'em, it's quite edifyin'. I've larnt more new things, and more things I niver knew afore, in half an hour in the Assembly, than ever I heerd afore in my life, and I expect the other House will be quite as wise." "Well, I'm glad to hear you say so," said Nicholas. *"I feel somehow quite encouraged myself.* If we had a bounty of about a shilling a bushel for raisin' potatoes, two-and-sixpence a bushel for wheat, and fifteenpence for oats, I think a body *might* have a chance to make out to scratch along to live here; and I'm told when the Council doors are opened, we shall actually get them. *I must say I feel quite encouraged myself.* But stop," said he, laying his hand on Mr. Slick. "Do you see that 'are varmint a-lookin' arter the old lady's chickens over there by the barn? I had a crack at him yesterday, but he was too far off. Wait a bit!" and he scampered off to the house, brought out his gun (which had been previously loaded), and throwing himself on all fours, proceeded towards the barn as rapidly as a quadruped. "Stop, stop, daddy!" said a little, half-naked imp of a boy. "Stop till I get my cock-shy!" "Well, bear a hand, then," said he, "or he'll be off. I won't wait a minit."

The boy darted into the house, and returned in an instant with a short, round, hard-wood club in his hand, and throwing himself in the same posture, thrust his head under the skirts of his father's coat, and crawled after him, between his legs, the two appearing like one long, monstrous reptile. The hawk, observing this unusual motion, rose higher in the air, as he slowly sailed round the building; but Nicholas, not liking to be baulked of his shot, fired at a venture, and fortunately broke his wing. "Stop, daddy!" said the boy, recovering his feet —"stop, daddy! it's my turn now," and following the bird that fled with inconceivable rapidity like an ostrich, half-running, half-flying, threw his cock-shy at him with unerring aim, and killed him. "Ain't he a whopper, daddy?" said he. "See!" and he stretched out his wings to their full extent; "he's a sneezer, ain't he? I'll show him to mammy, I guess," and off he ran to the house to exhibit his prize. "Make a smart man, that," said Nick, regarding his boy, as he carried off the bird, with looks of entire satisfaction —"make a considerable of a smart man that, if the Assemblymen would only give us a chance. But *I feel quite encouraged now.* I think we shall have a good brood of chickens this year, now that thievin' rascal has got his flint fixt; and if them three regiments come to Halifax that's talked of this winter, poultry will fetch a'most a grand price, that's sartain. It appears to me there's a hawk, or a wild cat, or a fox, or a lawyer, or a constable, or a somethin' or another, for everlastin'ly a-botherin' of a poor man. But I feel *quite encouraged now."*

"I never see'd that critter yet," said the Clockmaker, "that he didn't say he felt 'quite encouraged.' He's always lookin' for the Assembly to do great things for him, and every year feels 'quite encouraged that they will do sunthin' at the next session that will make his fortin. *I wonder if folks will ever larn that politicks are the seed mentioned in Scriptur' that fell by the roadside, and the fowls came and picked them up. They don't benefit the farmer, but they feed them hungry birds, the party leaders.*

"The bane of this country, Squire—and, indeed, of all America—is havin' too much land. They run over more ground than they can cultivate, and crop the land so severely that they run it out. A very large portion of land in America has been run out by repeated grain crops; and when you add to that land naterally too poor to bear grain, or too broken for cultivation, you will find this great country in a fair way to be ruined.

"The State of Varmont has nothin' like the exports it used to have, and a plaguy sight of the young folks come down to Boston to hire out as helps. The two Carolinas and Varginy are covered with places that have been given up as ruined, and many other States. We haven't the surplus of wheat and grain we used to have in the *U*-nited States, and it never will be so plenty agin. That's the reason you hear of folks clearin' land, makin' a farm, and sellin' off agin and goin' farther into the bush. They've exhausted it, and find it easier to clear new lands than to restore the old.

"A great deal of Nova Scotia is run out; and if it warn't for the lime, marsh-mud, sea-weed, salt-sand, and what not they've got here in such quantities, there'd be no cure for it. It takes good farmin' to keep an upland location in

order, I tell you, and make it sustain itself. It takes more to fetch a farm, too, that's had the gizzard taken out of it, than it's worth. It actilly frightens me, when I think your agriculture in Britain is progressin', and the land better tilled every day, while thousands upon thousands of acres with us are turned into barrens. No traveller as I've seed has noticed this, and our folks are not aware of it themselves to the extent of the evil. Squire, you and I won't live to see it; but if this awful robbin' of posterity goes on for another century, as it has progressed for the last hundred years, we'll be a nation of paupers. Very little land in America, even of the best, will carry more than one crop of wheat arter it's cleared, afore it wants manure; and where it's cleared so fast, where's the manure to come from? It puzzles me—(and I won't turn my back on any man in the farmin' line)—the Lord knows, for I don't. But if there's a thing that scares me, it's this."

"Hullo! hullo!" said a voice behind us, and when we turned to look from whence it came, we saw Nicholas running and leaping over the fences of his neighbours like a greyhound. "Stop a minit!" said he. "I want to speak to you. I feel *quite encouraged* since I seen you. There's one question I forgot to ask you, Mr. Slick, for I should like amazin'ly to have your opinion. Who do you go for?" "I go for the Squire," said he; "I'm a-goin' for to go round the sea-coast with him." "I don't mean that at all," said he. "Who do you go for in the election? There's to be a poll a-Monday to Kentville, and Aylesford and Gasperaux are up. Who do you go for?" "I don't go for either of them; I wouldn't give a chaw of tobackey for both on 'em. What is it to me who goes?" "Well, I don't suppose it is; but it's a great matter to us. Who would you advise me to vote for?" "Who is a-goin' for to do the most good for you?" "Aylesford." "Who promises the most?" "Aylesford." "Vote for t'other one, then; for I never seed or heerd tell of a feller yet that was very ready with his promises, that warn't quite as ready to break them when it suited his purpose. And if Aylesford comes a-botherin' of you, call out little Nick with his 'cock-shy,' and let him take a shot at him. Any critter that finds out all the world are rogues, and tells of the great things he's a-goin' for to do, ginerally overlooks the biggest rogue of all, and that's himself. Oh! Gasperaux for ever! He's the man for your money, and no mistake." "Well," said Nicholas, "I believe you're half right. Aylesford did promise a shillin' a bushel bounty on potatoes, tho'; but I believe he lied, after all. I'll take your advice. *I feel quite encouraged now.*"

Nicholas gone, Sam Slick continued:

"Yes; too much land is the ruin of us all this side o' the water. Afore I went to England I used to think that the onequal divisions of property there, and the system of landlord and tenant, was a cuss to the country; and that there was more dignity and freedom to the individual, and more benefit to the nation, for every man to own the land he cultivated.

"In Nova Scotia there are hundreds and thousands that would be better off as tenants, if they would but only think so. When a chap spends all his money in buyin' lands, and mortgages them to pay the rest of the price, he ain't able to stock his farm, and work it properly; and he labours like a nigger all his life, and dies poor at last, while the land gets run out in his hands, and is no good for ever after. Now, if he was to hire the farm, the money that he paid for the purchase would stock it complete; enable him to hire labour; to wait for markets; to buy up cattle cheap, and to sell them to advantage. He'd make money hand over hand, while he'd throw the cost of all repairs and improvements on the owner. But you might talk till you were greyheaded, and you wouldn't persuade folks of that in this country. The glorious privilege of having a vote, to give to some goney of a member, carries the day. Well may they call it a dear privilege that, for it keeps them poor to their dyin' day. No, Squire; your system of landlord and tenant is the best for the farmer, and the best for the nation. There never can be a high state of general cultivation without it. Agricultur' wants the labour of the farmer and the money of the capitalist; both must go hand in hand. When it is left to the farmer alone, it must dwindle for want of means, and the country must dwindle too. A nation, even if it is as big as our great one, if it has no general system of landlord and tenant adopted in it, must run out."

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 3745.

THE EARTH AND THE MOON

CONTINUED FROM 3414

NEXT to the sun, though not to be compared with it in importance, the moon has had the greatest influence on the life and history of the earth. It is our nearest neighbor. Sometimes it is no more than 220,000 miles away. Perhaps some day the wireless instruments of the earth may be able to carry as far as this, if there were any men on the moon to receive a message. Besides being so near, the moon is not very different from the earth in substance. It measures about 2,200 miles in diameter, rather more than a quarter of the diameter of the earth. It is not quite so dense. If we could weigh a slice of the earth and a slice of the moon of equal size in the same scales, the slice of the moon would weigh about two-thirds the slice of the earth. About fifty moons could be packed like small shot in a ball the size of the earth.

In all the sun's family of planets there is no other satellite that is anything like the same size when compared with its parent. Nor is there any other planet that has only one moon. The earth and the moon together form the only true couple in the solar system.

The moon, we have said, is sometimes 220,000 miles distant; it is also sometimes as much as 253,000 miles away, for it travels round the earth in an ellipse. But, however near or far, it turns always the same face to the earth. It sometimes travels faster and sometimes slower. Because it is tilted a little like a top that does not spin quite upright, we who are on the earth sometimes see a little strip more at one side or the other or at the top or bottom, lighted by the glare of the sun. The tilt from the upright is very small—only six degrees from a right angle.

We have spoken of the moon as spinning like a top, and so it does, but it spins very slowly. It turns round only once during the whole time it takes to travel round the earth.

If you should wonder how it can be spinning at all, as it always turns its face to the earth, imagine yourself to be the moon, and stand facing a bowl of flowers sitting in the middle of a round table. We take this bowl to be the earth, and the rim of the table marks the orbit of the moon in traveling round the earth. For better illustration you might put a lamp at your back to represent the sun, which shines both on you, the moon, and on the bowl of flowers, the earth. Now move round the table, always keeping your face to the bowl of flowers, and when you have moved halfway round the table the sun, or the lamp, which was at your back, will now be shining full in your face. So evidently you must have turned half round. Pursuing your journey in the same way, you come back to the point you started from. You must have made

one complete turn, though you have always kept your face to the flowers. That is what the moon does. Its path round the earth is traveled in 27 days 7 hours 43 minutes 11.5 seconds. In that time the moon turns on itself.

THE SHINING MOON THAT STIRS THE THOUGHTS OF MEN

This estimate, accurate to the fraction of a second, is only one of many which astronomers and mathematicians have made. For hundreds of years they have been calculating the motions of the moon, which not only influences the life and history of the earth, but also has stirred men's thoughts. Sir Isaac Newton obtained information from her of the law of gravity. In our own day two great mathematicians, Henri Poincaré and Sir George Darwin, spent half their lives in tracing the past and future of the tides which the moon, as well as the sun, raises on the earth. They followed back the joint career of the moon and the earth through ages. The work still goes on, and Professor E. W. Brown has taken thirty years to calculate those tables which appear in the famous Nautical Almanac. By foretelling almost exactly the positions of the moon at any time in any year, at any hour, they enable us to ascertain the times of the tides.

THE WONDER OF THE WATERS THAT THE MOON SENDS ROUND THE EARTH

The face of the moon is the most mysterious object on which we gaze, a greater mystery than the face we never see; but it is the tides the moon draws toward herself from the earth which are the symbol of the unending wonder of her history and ours. Twice a day the moon gathers up the waters of the earth and sends them pulsing round the globe to sweeten and purify it, to help to give birth to the winds and the rains, to cause the rivers to flow, to make life more varied. Twice a day, also, although we do not feel it, the moon lifts the crust of the earth a small fraction of an inch, as has been shown by refined experiments carried on at the Yerkes Observatory. Always the moon has been doing this. It was doing it when there was not a drop of water on the earth. In those days it pulled the earth's crust higher because the crust was then softer—more like the lava which flows from volcanoes. Farther back in time it was pulling it higher still; and at the same time the earth was pulling up the moon's glue-like surface.

If we go back as far as calculation will take us we reach a time when these semi-solid crustal tides of the earth and the moon were of enormous size. They were very slow, for the two bodies were probably closer together than they are now. That was perhaps sixty million years ago. Each was pulling at each, and the sun was pulling at both, while each was spinning round in about the same time. The speed of the spin was much greater then. But the solid tides that were being raised on them began to slow them down, not much at first, but more and more as time went on. As they began to slow down they drew farther from one another, till the moon reached the place where she now is, her speed of turning so reduced that it occupies more than 27 days, while the earth now rotates in 24 hours. Both speeds will go on diminishing till both become alike again, but it will be a very long time before it happens.

A DEAD WORLD IN THE HEAVENS, WITH NOT A BREATH OF AIR

That is a leap into the future; now let us look one step farther into the past. How came it that the moon and the earth were so close together? One explanation is that once they were one. When we scan the moon's scarred face at night we look at a dead world, a world that does not know the stir of air or water, on which not a flower blooms, not a tree grows, not an insect creeps. Not a sound is heard, not a thing is moving, save that perhaps in the fierce heat beating on it some shuddering crack of its strained, tortured surface may take place.

As it has been, so it will be; no imaginable accident can alter its state save one which would overwhelm earth and moon and sun alike in "unremorseful clouds of rolling fire." As it is, our moon is likely to see the sun's light go out.

We can never know for certain just how the moon began. There are two explanations. Many astronomers think that once the spinning earth was shaped like a pear. As it spun the shape became more like that of an hourglass, though one end was larger than the other. The neck of the hourglass became thinner, until finally it separated into two parts. These astronomers think that for ages the earth and the great broken-off frag-

THE EARTH SEEN FROM THE MOON

The massive mountain peaks of the moon and how the earth would look from them.

ment spun side by side. Then, under the influence of the sun's attraction, and then of the two fragments' own actions, the moon drew farther away in the manner we have told. When the great fragment broke away to begin its own independent career it had a birthright of five thousand million cubic miles of matter; and possibly the gap it left is now the bed of the Pacific Ocean.

The other explanation of the birth of the moon is that it was once a little knot in the nebula that became our solar system. It was so near the earth, and so much smaller, that the earth attracted it more than the sun, and so it became a satellite of the earth instead of a planet of the sun. We show you this explanation on page 144, and shall say more about it later.

What the career of the moon since that catastrophe has been we may never know except dimly. But on the face shown to us is written the story of long ages of the fiercest turmoil. Of the moon's present condition we know a great deal. The sun pours down on it unceasingly through a day of three hundred hours. No life like ours could exist in the heat that reaches there, but on the other side the moon is as cold as ice, and no life like ours could endure a cold like that. A man living on the moon would spend his day in the tropics and his night in the Arctic. He would have to endure such heat and cold alternately as human beings have never known.

The moon has no atmosphere, and the fierce heat of the sun pours down on it unchecked. There is no blanket to

The moon, showing the mountain ranges and the craters, as seen through a telescope.

THE WAY TO THE MOON'S NORTH POLE

THE NORTH POLE OF THE MOON, WITH THE MARVELOUS CRATERS AND MOUNTAIN RANGES

We see here the moon photographed as it appears in the sky with the North Pole at the top. Telescopes show an inverted image. The centre crater near the top is Plato; to the right are the Alps, and the straight cut through them is the Alpine Valley, 80 miles long and 5 miles wide. This photograph was taken by Mr. G. E. Hale from Mount Wilson Observatory.

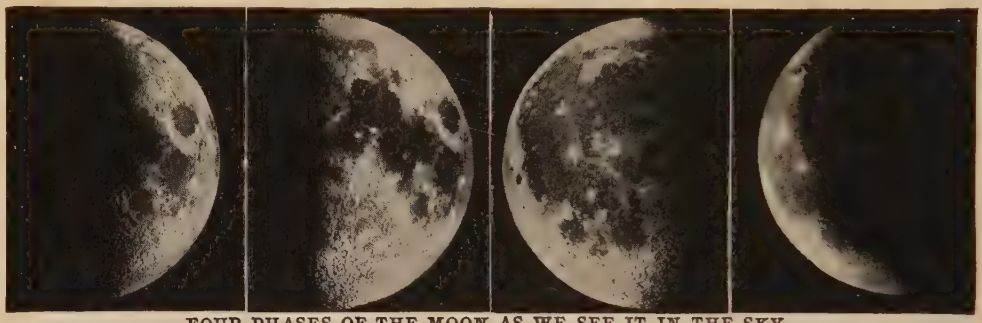
break its heat or soften its dazzling light, and as there is no atmosphere, there is no sky-light, so that the sun shines on the moon from a dense black sky. It would look like a great white ball shining in pitch-black night. When the sun withdraws its light and the moon is wrapped in night, the darkness there must be as in the darkness of a pit. A day and a night on the moon are equal to a month on earth, so that for fourteen of our days a man on the moon would live in light and heat unknown to us, and for fourteen days more in blackness and cold.

We can hardly think of a world like that as anything but dead, and if the moon was born when the earth was born, we may ask why it has died so soon. Why is the earth still covered with green trees, and carpeted with flowers, and

4. And we know the moon, an extinct and barren world, a world of death, as the earth may one day be.

The moon is in the fourth of these stages. At the most it can have but a continually freezing "atmosphere," which is not a thousandth part as ample as the atmosphere of the earth, and which consists of a life-stifling gas. Therefore no sound could travel there. No speech is possible; the Man in the Moon, if there were one, would be deaf and dumb, for sound depends on air, and air the moon has none—or, if there should be any at all, it must be thinner than what we on the earth call a vacuum.

Weird and strange indeed are the scenes on this dead world, and it is one of the triumphs of the human mind that we know them well. Long before we knew



FOUR PHASES OF THE MOON AS WE SEE IT IN THE SKY

throbbing with the life of a myriad myriad living things, while the moon is dead and bare? It is because the moon is smaller. The earth, owing to the powers of attraction which are conferred on it by the law of gravity, can hold to itself an atmosphere, and clothe itself with life-supporting air as with a garment; but the moon cannot retain a hold on these lighter gases. The moon can hold only the heavier ones, such as carbon dioxid, and carbon dioxid will not alone support any form of life.

There are four sorts of worlds we know:

1. We know the nebula of Orion, a mighty mass of gas moving about the universe as the earth once moved about.

2. We know the planet Jupiter, once like the nebula of Orion, but now condensed into a liquid mass like a world of boiling metal.

3. We know the earth itself, with its core still hot, but its surface fitted for life and enveloped in an atmosphere that makes life possible.

the North Pole of the earth men knew the North Pole of the moon. Men find their way about the moon more easily than about the interior of Australia or parts of Africa. It was the first thing man began to study in the heavens. It filled men with dread in ancient times. It gave them their first ideas of anything beyond this world and their first glimmering of the outer universe. The shepherds of Chaldea would sit and look at it, and think it a sort of mirror in which the image of the earth reflected back. After Calvary men thought they saw the figure of Judas in the moon, suffering exile for his treason to mankind.

Long after that wise men looking at the moon through telescopes imagined that the marks they saw were made by men, just as some men to-day think they see the work of men on Mars. Old Kepler used to think that these huge crater-walls on the moon were built by men; they looked to him like the walls of pits built as shelters from the long, fierce action of

IMAGINARY VIEW OF THE MOON LONG AGO

AN IMAGINARY PICTURE OF LUNAR VOLCANOES AGES AND AGES AGO

AN ARTIST'S CONCEPTION OF A CRATER POURING OUT FIRE AND SMOKE ON THE MOON

the sun. But Kepler did not know the nature of the things he saw, their vastness and their age. Let us look at them as Kepler never saw them. A boy and girl to-day can see what Kepler and Galileo would have given their lives to see. We can see the moon through a telescope that brings it as near as Mont Blanc seen from Lyons. There are telescopes that bring it within forty miles, and, as there is no atmosphere hiding the moon, the forty miles may be sometimes as thirty miles, or even less.

A JOURNEY OVER THE HILLS AND IN THE VALLEYS OF THE MOON

Is there anything more enthralling than a walk about the moon? It is not a mere fancy, for we can see the way to go. We can fancy ourselves climbing up steep cliffs, and running through valleys, and roaming over hills. The very places are named, and we can find them on the map of the moon. We can watch the sunrise and the sunset, we can see the shadows stealing over mountain peaks, and trace them like church steeples for miles and miles and miles. We know how big they are, how steep they are, how deep they are. It is all like a miracle when we think what it means, for a thing on the moon must be thirty miles wide to be seen as a pin-point with the naked eye on earth; but the telescope *is* a miracle. It gives a man new eyes, eyes that take him to another world. Many a man lives now who has traveled in imagination on the hills and valleys of the moon more widely than on the earth. Men know the Alps of the moon who have never seen the Alps on earth, and many a man has seen a crater on the moon who has never seen one here.

THE HUNDREDS OF COLOSSAL CRATERS ON THE FACE OF THE MOON

It is these craters that seize the imagination. They are the handwriting on the moon. They are gigantic beyond anything seen on earth, and the forces that made them are beyond our understanding. There are hundreds of them. Their walls rise up miles high, and some of them are so wide that two men standing on opposite sides would be a hundred miles apart. The walls rise sheer like walls of houses, but they fall away outside. One explanation of the causes of these craters is that they are the results of great volcanoes. Another explanation of these craters is that they mark the places where great explosions of gas burst out through the thin crust of the moon without throwing out much lava.

The earth can hardly have known explosions to equal these. The moon is much smaller than the earth, and parted with its heat more quickly, and gravity there has only one-sixth of its force on earth. Explosive forces on the moon, therefore, would be six times as effective as on earth. Everything on the moon is very much lighter—a brick that weighs six pounds here would weigh one pound there; a man who can jump six feet here would jump thirty-six feet there; a gun that fires ten miles here would fire sixty miles there.

THE ERUPTIONS THAT SENT FORTH A THOUSAND CUBIC MILES OF MATTER

We can imagine, therefore, that those internal forces that seem almost to have torn the surface of the moon to bits must have been beyond all human experience or conception; in parts the surface of the moon is thick with craters, and rising from the floor of the craters we find enormous cones standing like obelisks. Sometimes they are a mile high, and sometimes there is another crater inside the outer one. Some craters have cracks across that are quite a mile wide. One great crater, over fifty miles across, is filled to the brim with lava, as if it had oozed out after the walls had been formed until it filled the huge round pit with a mass of solid rock. Some astronomers estimate that sometimes, in these explosions on the moon, a single eruption may have sent forth, crashing out of the red-hot depths, a thousand cubic miles of matter. We read of a regiment of soldiers encamping in the crater of Vesuvius in the days before the destruction of Pompeii, but the whole of one of our counties could be contained in a crater of the moon. There are gaps across the surface which are sometimes a mile wide and a hundred and fifty miles long, and deeper than from the top of our highest mountain to the bottom of our deepest sea. There are on the only side of the moon that we can see at least thirty thousand craters, and most of them have been given names.

ANOTHER EXPLANATION OF THE CRATERS ON THE MOON

There is still a third explanation of these craters. It is that the rough surface of the moon may have been caused

by external bombardment and not by internal explosions. This explanation is based on what is called the Planetesimal Hypothesis. Some men believe that the craters were formed by the collisions of wandering masses of material with the moon's surface. Even to-day small masses sometimes strike the earth. These great masses might strike the surface with a speed from fifty to a hundred times that of a rifle bullet. By firing projectiles of various materials at targets of different kinds experimenters have duplicated in miniature the craters of the moon.

According to the Planetesimal Theory the nebulæ were formed by the collision or else the close approach and tidal pull of two stars. The denser portions of these nebulæ are called nuclei. As these nuclei moved around the star from which they had come, they slowly swept up scattered outlying particles and thus became larger and larger, like rolling snowballs. In this way the earth started and grew. The moon was formed from a smaller nucleus which was near the nucleus of the earth and controlled by it. This smaller nucleus, like the earth, grew

The shining White Lady of the Sky—a rare and lovely view of the new moon taken by Mr. Philip E. Belas at University College, Cork.

in size by adding particles encountered in its motion around the parent star—the sun. It is thought that the earth's atmosphere acted as a cushion and screened the earth from the heavy bombardment which the moon suffered. Even if the earth did suffer such a bombardment, the rains, snows and winds have had time to wear down and destroy the evidence. The moon has not these and has remained as it was. We cannot say for certain how the surface of the moon came to be as it is. No answer seems to explain everything, but the moon as it is we know.

And as chasms are deeper and craters are wider, so mountains are higher on the moon. A grain of mustard seed on a globe three feet across would represent the highest mountain on the earth, but a grain of seed on a globe one foot wide would stand for the highest mountain on the moon. Cliffs on the moon are much steeper than on earth, and the mountain scenery, if we could see it as we see our Alps, would be far grander than our own.

There are ten great mountain ranges; and one of the finest observers of the moon, Professor Shaler, gives reason for believing that some are continued on the unseen side of the moon, which in all probability resembles in all its leading features the side that we can see. Some of these have been named for chains on the earth.

One mountain chain has three thousand mountains packed together. The range we call the Alps has 700 glorious peaks, and an immense valley 80 miles long and 5 miles wide that seems to have been cut with a knife. Astronomers watch the sun rise on these peaks as travelers watch it rise in Switzerland. The Apennine chain, reaching out 450 miles, ends in a precipitous face which at sunrise throws a shadow over the plain for eighty miles.

But more amazing than these mighty shadows are those white pathways that seem to creep wherever we look in the moon. From one great crater we can trace them for a thousand miles. One is said to be 1,700 miles long, and they are sometimes 25 miles wide.

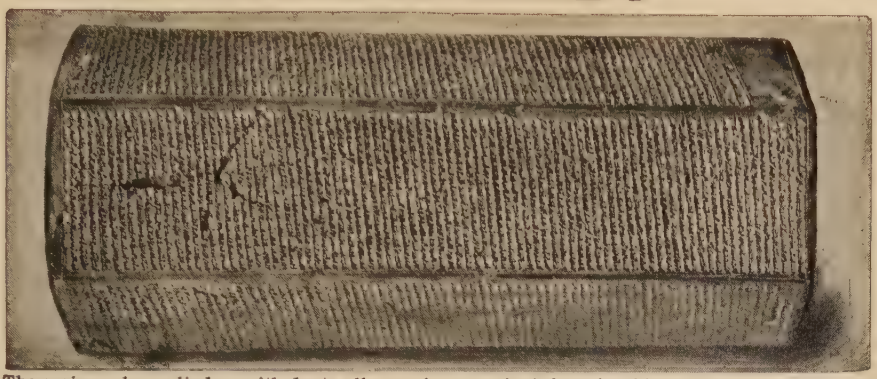
THE MYSTERY OF THE GREAT WHITE STREAKS ACROSS THE MOON

They go over mountains and plains, over craters and through valleys, straight on everywhere, marching like the lemmings in those vast migrations which lead them in a straight line to the sea. Somebody has said that if a brush had been drawn across the face of the moon in a thousand directions, the effect would be to give us these white streaks, and they are among the mysteries of the lunar world. Some think that they are outflowings of lava through the great cracks around volcanoes, but astronomers are much puzzled by them. They are also puzzled by those enormous areas on the moon which look like seas. They are not seas, for there is no water on the moon. But perhaps these great, smooth surfaces may be due to the falling of the thin crust into the molten bed below. What we see may be a molten lake turned solid. Of course they are not so smooth as they seem, but are broken by ridges and cracks.

It should be noted that some astronomers have pointed out that the great craters of the moon, and the enormous number of them, are totally unlike anything which volcanic action has produced on the earth. There are some craters in Hawaii which continually well up and form crater walls; and these Hawaiian craters, though so much smaller—only a few miles round at most—are the only ones much resembling the great lunar features. Our explosive craters, like those of Vesuvius or Etna, are not in the least like the moon's.

But the long, strange story of the past tells of a strange service that the earth owes to the moon, and we may end with some ideas from a book in which one of the editors of our book touches on the moon. As far as we can know, the whole of human history would have been changed, and every individual life on the earth would have been changed, but for the moon. The greatest influence it has had on the earth in its millions of years has been to slow earth down, so that a day on the earth, which used to be four or five hours, has now become twenty-four. What life would have been with four or five hours of light and four or five hours of dark, we can hardly think—nor can we think what life will be on earth when the moon has slowed us down still more, so that our day becomes as long as a month, and one side of the earth will be for a month in sunlight while the other side has a month of dark and cold. However, the change in the length of a day cannot be more than a second in many thousand years.

THE NEXT STORY OF THE EARTH IS ON PAGE 3665.



The curious clay cylinder, with dents all over, is an ancient Assyrian history book from Nineveh.

HOW MAN LEARNED TO WRITE

CONTINUED FROM 3424

WHAT a different place the world would be if no one had ever learned how to write! We should have no telephones, no airplanes, no telegraphs, no trains, no newspapers. We should know nothing about how our forefathers fought for liberty and won it. We should know nothing about the great men of the past. We should live in dense, dark ignorance of all that goes on in this great world except in our own little corner of it.

You will begin perhaps to think that writing is the greatest invention in the world; but the fact of it is that the art of writing grew so gradually and naturally that it can scarcely be said to be an invention at all. Of course, like everything else that man does, writing had a beginning; but it was such a beginning as a baby makes when he demands a pencil and paper so that he may "draw pictures."

From very early times it was desirable to keep count of possessions, as of the number of sheep a man owned, or to mark the passage of time. Notches in sticks or knots in strings were made, and some of these plans grew to be very elaborate, so that other men could read the meaning of the sticks or the strings. We are told that historical events or laws could be communicated in some way which we do not quite understand.

In very early times people began to make pictures of the animals that they hunted in the chase, or that roamed through the woods about them. At first, no doubt, the pictures were just as crude as the pictures made by baby hands, but by and by the skill of these early artists increased. They ornamented pieces of bone and horn and the walls of the caves in which they lived with pictures of men and animals. Some of the pictures, as you can see on page 190, were wonderfully well done, and must have been cherished by their owners among their greatest treasures. Probably these bone and horn pictures were often sent as gifts of friendship from the head or chief of one family or tribe to the head or chief of another. Soon the carved figures in the pictures were used as symbols to convey messages. But if, for instance, one chief sent another an invitation to a feast, while the second man thought it was a threat of war, dire confusion would be the result. So it naturally came about that it was agreed that the pictures of certain animals should always be used as symbols to mean certain things, and that is how writing began.

The Indians of the New World developed elaborate systems of picture-

writing which some of them have used even down to the present day. Not only did they learn to tell the story of a battle or some other event, but also they expressed a few ideas. For example, hunger was shown by drawing the picture of a man with his ribs showing. Sorrow was represented by an eye from which tears were falling. The Indians, however, did not go much further, as they did not develop a high degree of civilization.

In the Old World, however, as the years went on, and the chiefs of tribes became great men and kings of nations, they were not satisfied that their deeds should be handed down only by word of mouth. They feared that remembrance of what they had done might be lost, or that an enemy might tell another tale. So they began to set them down, not in books such as we have, for they had none, but on stone, or, where they had no stone, on tiles or bricks.

As we have read in the story of ancient Egypt, the Egyptians wrote their early books in beautiful picture-writing which we call hieroglyphics. This writing was carved on their pillars and painted on the walls of their temples, palaces and tombs, or written on books of linen or papyrus. The Babylonians used a different kind of writing which was called the cuneiform, because it looks as if the signs were made up of arrowheads. The word cuneiform means "wedge-shaped."

How the Babylonians and Assyrians learned to write

The Sumerians, who lived in Mesopotamia, where there was no stone, and had to build their cities of brick, used clay tablets or cylinders for books. The writing was done by pressing an instrument into the damp clay, and this made the clay spread at one end, so that the mark looked something like an arrowhead. After the writing was done, the tablet was dried in the hot sun or burned in a kiln. It was difficult, of course, to make pictures in this way, and gradually the signs became conventionalized; that is, they were made with such simple lines that they ceased to look like birds and animals and became the oddly shaped lines of cuneiform writing.

The Babylonians learned this writing from the Sumerians. In their turn the Assyrians learned to write from the Babylonians, and when Athens was yet unbuilt, and the seven hills of Rome were wooded slopes, the city of Nineveh had a great library, with shelves laden with thousands of books written on clay tablets.

We must remember that few people who lived in the days of which we have been reading could learn to read, and fewer still to write. There was no such thing as an easy alphabet of twenty-six simple letters from which all the words in the language could be built up. Every sign meant a word or a syllable, and each of these signs had to be learned and remembered.

How the alphabet was made and a knowledge of writing spread

This did well enough for a time, but as ideas grew and men learned more about life and the world in which they lived, they needed a larger number of signs than they had in the beginning. The Egyptian priests tried to overcome the difficulty by using pictures for letters as well as for signs for words and syllables. Other peoples of the East went farther still. They used signs to represent sounds instead of words, and from these signs they built up words. In course of time the signs used became simpler in form and fewer in number, and at length the alphabet which the Greeks learned from the Phœnicians appeared.

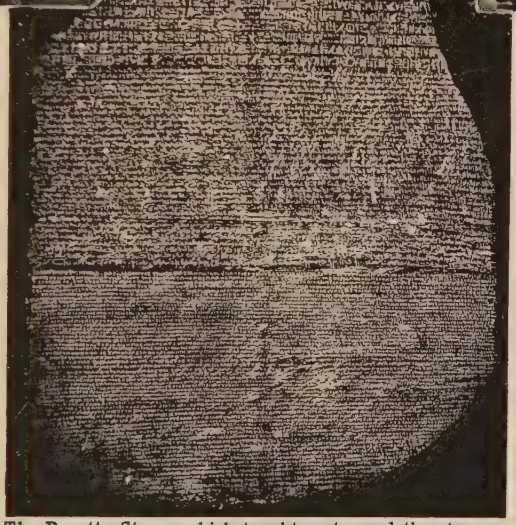
When your fathers and mothers went to school they were probably taught that the Phœnicians invented their alphabet, but we know now that they only took the simplest signs from an earlier system of hieroglyphics, or picture-writing, and used them to represent the sounds that they heard in the human voice. Many scholars now think that they got these signs from the Egyptians; others say that they learned them from some of the Syrian peoples; and others again say that they may have got them in Crete. At any rate, the Phœnicians taught this new way of writing, with an alphabet, to the Greeks, who changed it somewhat and added signs for vowel sounds which the Phœnicians had not used. The name of the first Greek letter is *alpha* and the second *beta*. So you see where the word "alphabet" comes from. Long afterward the Greeks taught it to the Romans.

The Romans also changed the Greek alphabet to some extent. The Latin tongue, which was spoken by the Ro-

HOW THE WORLD'S STORY WAS FIRST TOLD

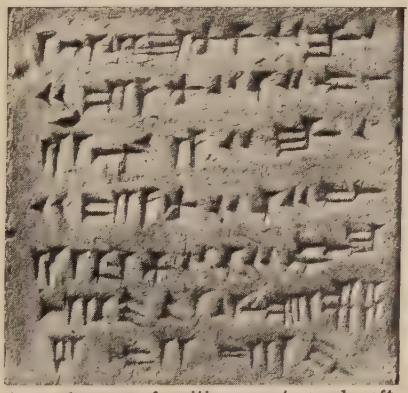
The Egyptians painted the walls of their temples and tombs with letters and pictures which tell the history of Egypt. This is from the wall of a tomb where the paint is still fresh, though thousands of years old.

Cleopatra's Needle, once in Egypt, now on Thames Embankment, London, shows the writing on the Egyptian monuments.



The Rosetta Stone, which taught us to read the strange writing the Egyptians left behind. It said the same thing in three kinds of writing, and one was Egyptian. Men knew one of the other kinds of writing, and were able to learn what the Egyptian meant. Later, inscriptions on a cliff-face in Mesopotamia were deciphered.

There was no paper in old Egypt, and the people wrote on bricks and on sheets made from the stem of the papyrus plant.



An early way of writing was to mark soft clay and bake it into a brick like this.

A piece of papyrus showing how the Egyptians used it to write upon. It was made from strips of the papyrus plant.

mans, became the language of the Church and missionaries of the Church spread a knowledge of writing through the nations of Western Europe, and it is the Roman alphabet that we use.

How the alphabet used by the Slav nations was made

In the ninth century the Moravians and Bohemians, Slav peoples of whom we read in the story of Czecho-Slovakia, were converted to Christianity by a Greek monk named Cyril. Cyril, who was a learned man, made an alphabet in Greek characters for the Slav language, so that his new converts could learn to read and write. The Russians, who belong to the same race, also learned this alphabet, and Russian writing still bears a strong resemblance to the Greek. Many other people developed alphabets of their own.

You remember the beautiful story of how the learned Bede, in his old age, translated part of the Gospel of St. John into the English tongue. You must not think, however, that even if we could see his writing we could read it without much study. His manuscript looked like printing in queer capital letters, and not only was his language very different from the beautiful English that we now use, but there were no spaces between his words, and he knew nothing about the punctuation that makes our writing so easy to read. As books multiplied and libraries grew larger, the monks, who copied most of the manuscripts, learned to make their letters smaller, and large letters were used only as capitals for the beginning of sentences. Monks toiled ceaselessly in their convent cells to make copies of books, and many monasteries became famous for their beautifully written manuscripts, with exquisitely painted borders and initial letters.

Where the early printers got letters to make type

Of course many men besides the monks learned to write in the Middle Ages. Merchants and lawyers, the secretaries of great men and many others found it necessary to learn to read and write. These people could not take time to write beautiful manuscripts, and rapid writing, with the letters of each word joined to one another, came into use. When the printing-press was invented, however, it was the beautiful "book hand" writing of the monks that was adopted by the printers. Later it was simplified, and many different styles of type have been cut.

The story of the Rosetta Stone

In the course of ages the writing of the Egyptians and Babylonians was forgotten. Men guessed that the pictures in the temples and on the monuments told a tale of ancient glories, but no man could read the story. At length, when even the most learned men had almost given up trying to find out what the strange writing meant, the Rosetta Stone, of which we read in the story of Egypt, was brought to light. It was found at Rosetta, in Egypt, by some French officers of Napoleon's army and was afterward brought to England.

The inscription is in three different kinds of writing: Greek, demotic—the name given to what we may call the business writing of the Egyptians—and hieroglyphics. Some of the words in the demotic writing were first learned. Then Dr. Thomas Young, an Englishman, was able to fix the sounds of some of the hieroglyphic signs. A French scientist named Jean François Champollion picked up the clue, and after much patient study he learned to read the hieroglyphics. He found that an eagle, for instance, stood for the letter *a*, a leg and foot for *b*, an owl for *m*, a chicken for *u*. A man with his hands lifted up meant the word prayer.

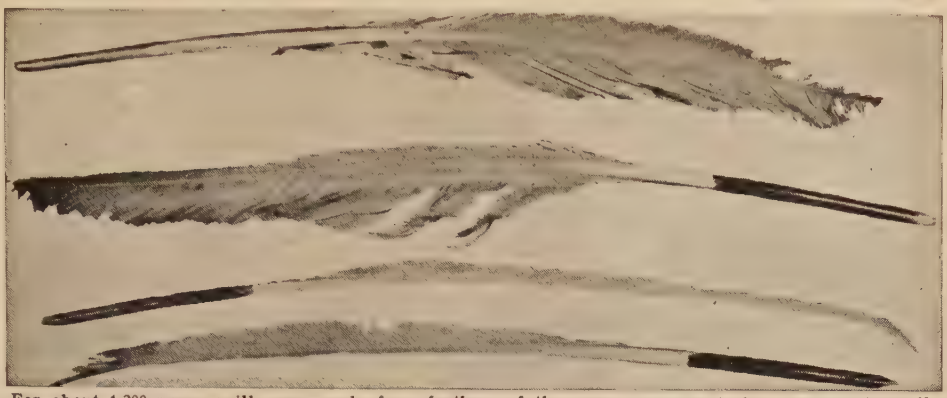
In the meantime the inscriptions on the rock of Behistun had been found. Sir Henry Rawlinson climbed a ladder from a narrow ledge of rock to copy the inscriptions, and from them he was able to learn the meaning of the cuneiform writing in which the history of Babylon and Nineveh had been written.

The Chinese never learned to use an alphabet, and to this day little Chinese boys have to learn thousands of word signs, or idiograms, so as to be able to read and write. The Japanese borrowed this method of writing from the Chinese, but their language is not the same, though it does contain many Chinese words or syllables.

The Egyptians wrote many books on papyrus

And now we ask ourselves on what were all the books written, for, of course, we know the manuscripts of the Middle Ages were not written on clay or stone.

MAKING PENS FROM A BIRD'S FEATHERS



For about 1,200 years quill pens, made from feathers of the goose, swan or turkey, were universally used. Some quill pens are still made in England for use in offices and courts of law.

The first process in making quill pens is to harden the quills by heating them in a vessel as the man is doing.

They are then carefully examined by an expert workman, and those suitable for the purpose are put together, ready for the cutter, who shapes the nib.

The cutter with a few strokes of his knife produces the finished pen. Men who do this work are very skillful and quick, and make hundreds of pens in a very short time.

The quill pens are then tied together in bundles. Of course the industry is declining every year.

Indeed, the Egyptians did not write all their books on stone. Even though Moses wrote the law on tables of stone, he probably knew how to write on papyrus rolls, which were used before his time.

The Greeks and Romans used papyri also, but their laws and public records in early times were written on stone tables and bronze tablets. All down through Roman history the Romans who could write carried about with them tablets made of wood or metal covered with wax, on which they wrote with a sharp instrument, made of metal, bone or ivory, called a stylus. When these notes had served their purpose the surface was smoothed with the flat end of the stylus, and the tablets were ready for other writing.

The Egyptians had learned to make parchment from the skins of animals before the Israelites came out of Egypt. It was used to write on five hundred years before the birth of Christ, and the Greeks and Romans used it to write some of the great books that have come down to us from their time. When papyrus became scarce, parchment came more into use. All the beautiful illuminated manuscripts of medieval times were written on parchment, or vellum. Vellum, which is a fine kind of parchment, is made from the skins of very young animals. Even after the introduction of printing, parchment was used.

THE CHINESE INVENTED PAPER LONG BEFORE IT REACHED EUROPE

Paper is said to have been invented in China by a man named Tsai Lun, a high official in the empire, who lived over two thousand years ago. It was nearly a thousand years before it was brought to the western part of Asia. Late in the tenth century, however, paper was made in Egypt. During the next hundred years it was made by the Moors, and the knowledge of its manufacture was brought from Morocco to Spain.

THE PENS IN USE IN ANCIENT TIMES AND IN OUR OWN

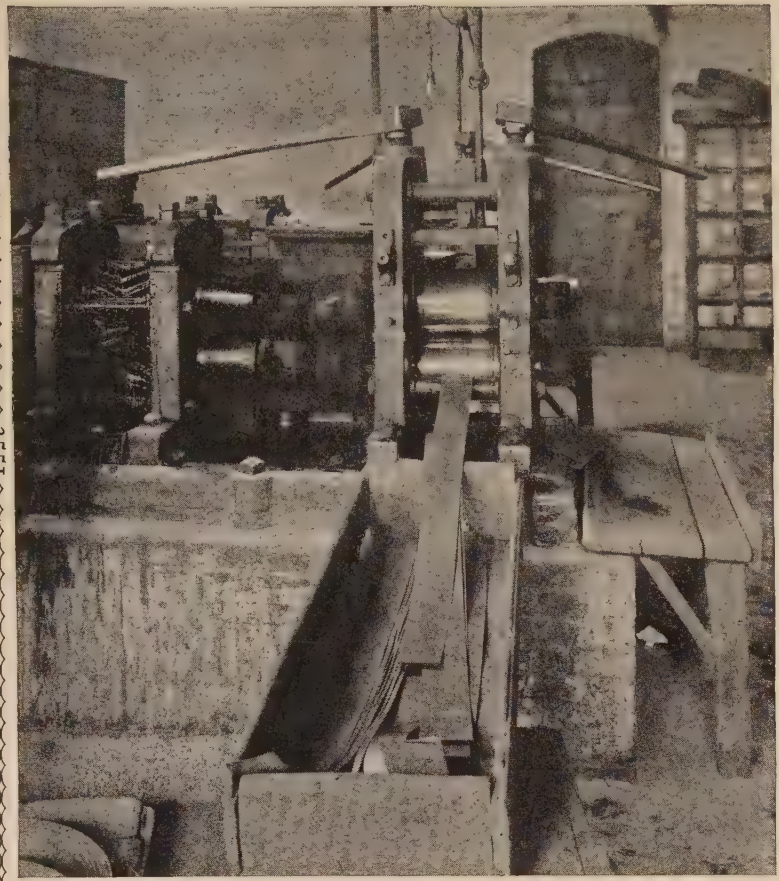
And now we ask, What kind of pens did the ancients use? Unfortunately we know little about them. The inscriptions on stone of course were cut, at first with stone instruments, later on with bronze and iron. Pens made from reeds, and split at the ends to form a kind of brush, were used by the Egyptians to write on their papyrus rolls. Brushes made of the hair of animals were also used, and the Chinese and Japanese use them to this day. The Egyptians invented ink, which they made from oak-galls and sulphate of iron. Reeds were also used for writing on parchment, and their use continued down to about the thirteenth century. However, before this time some copyists had found that the wing feathers of large birds made better pens, and for hundreds of years they were almost the only pens in use. During colonial days, and long after, a part of the duty of a teacher was to make pens for his pupils. A few old-fashioned people, particularly in Europe, still use quill pens, but they have almost gone out of use.

METAL PENS IN COMMON USE LESS THAN A CENTURY

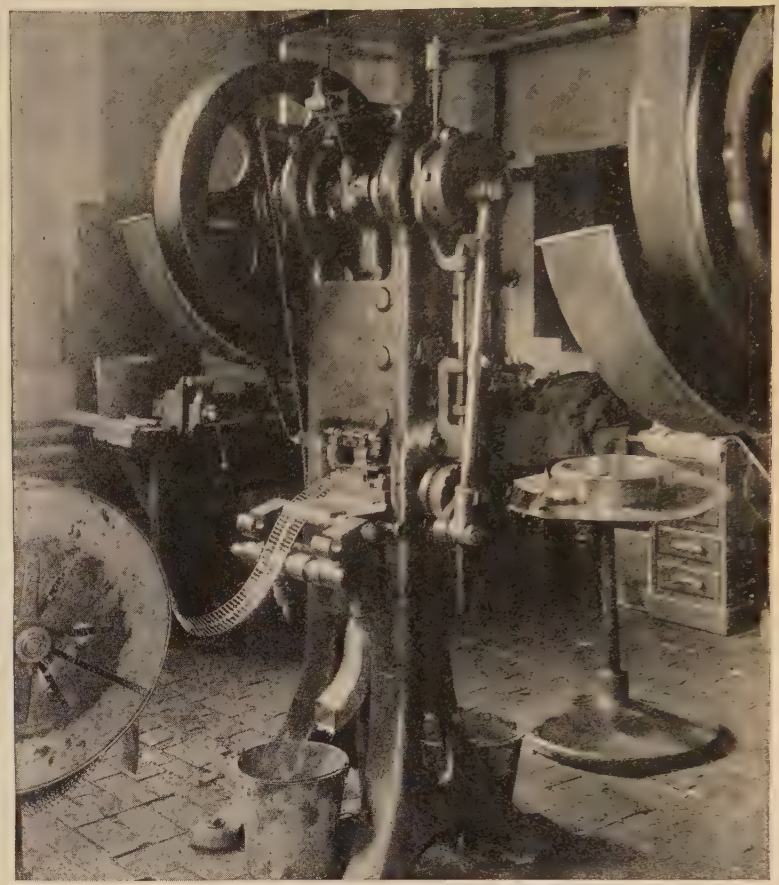
The Romans attempted to make metal pens, and bronze pens have been found at Pompeii, but they were not very satisfactory. A few brass pens were made in England in the seventeenth century, and a few steel pens in the eighteenth, but they did not become common until much later. About 1820 the manufacture of steel pens was begun in England by a man named James Perry. At first they were made by hand, and were very expensive, but a few years afterward James Mitchell began to make them by machinery. He was followed by Joseph Mason and Joseph Gillot, who helped to improve steel pens and make them flexible. The early pens were shaped as much as possible like a quill, and these barrel pens, as they are called, are still sometimes used in the British Isles. Their place was generally taken, however, by the short pens which we use. The first pen factory in America was established at Camden, New Jersey, by Richard Esterbrook. Steel pens quickly took the place, in Europe and America, of the less durable quill, and many million gross are used every year. About five steel pens a year are made for every person living in this country. For a long time the specially hardened steel used in their manufacture was made only in Europe, but large quantities of it are now made in America. Some pens are made of brass, while the nibs, or points, for fountain pens are of gold, with iridium at the tips. In fact, the use of fountain pens is becoming so common that perhaps the day will come when fewer steel pens will be made.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 3673.

HOW BLANKS FOR PENS ARE CUT FROM STEEL STRIPS



To make steel pens sheets of hard steel are cut into strips about as wide as two pens are long. These strips are kept for hours at a low red heat and then are cooled slowly. Next they are put through heavy rollers until thin enough for pens.



The strips then go to the cutting machine, which cuts out the blanks for pens, which fall into a vessel below. The strip from which the pens have been cut looks like fretwork.

Photos, courtesy C. Howard Hunt Pen Company.

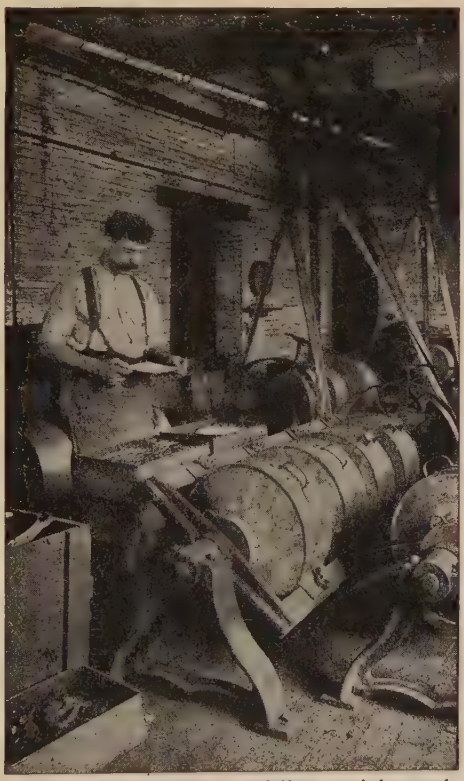
HOW PENS ARE PIERCED, MARKED AND SHAPED

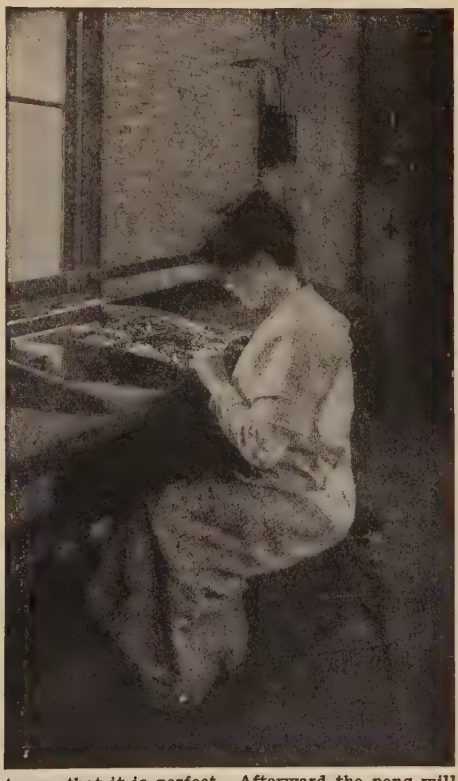
The blanks then go to the piercing machine, which makes the holes in the centre and the slits on the sides. The rolling process has hardened the steel and the blanks must be heated again and slowly cooled before they are stamped with the maker's name, the number, and are shaped.

The blanks, which have been quite flat, now receive the shape necessary to control the flow of ink. For this purpose they are put into this press, which is screwed down and bends them into the required curve. They are then hardened by making them red hot and then dropping them into cold oil.

THE FINAL PROCESSES IN MAKING PENS

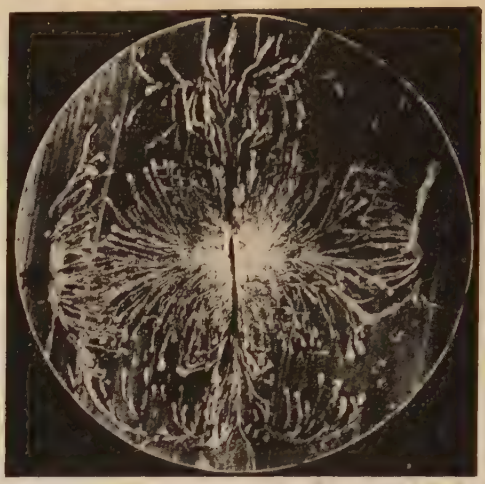
The pens are then cleaned and dried, after which they are tempered by being slowly heated and slowly cooled. Next they are cleaned and polished with sawdust in the barrels below on the left. The girl above is grinding the pens on emery "bobs," after which the points are slit in the tiny shearing machine.





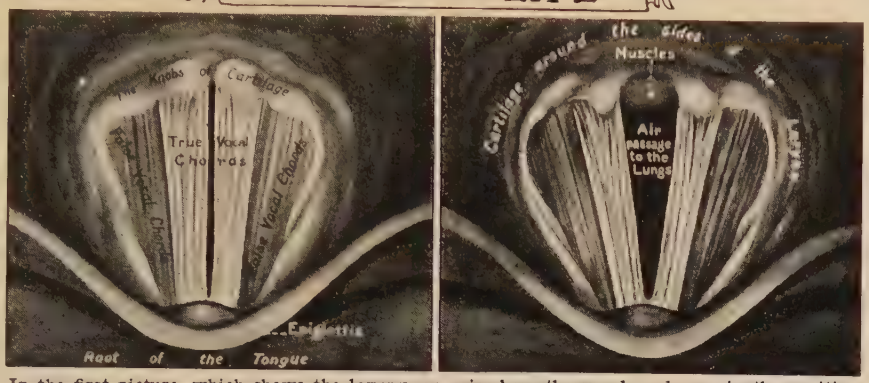
The girl on the right is carefully examining each pen to see that it is perfect. Afterward the pens will be packed in boxes, usually holding a gross, that is, twelve dozen. As you see, a common pen which is so cheap has come through many hands and has undergone many operations before it comes to you.

PICTURES DRAWN BY THE HUMAN VOICE



No artist drew these designs. A thin sheet of rubber was stretched over a vessel like a cup which had a spout at the side. Some light powder was thrown upon the rubber covering, and when someone sang into the spout, the powder formed itself into the design of the picture on the left. The right-hand picture was drawn in the same way, but moist paint was used instead of powder.

To obtain the left-hand picture, a sheet of glass was coated with paint and put over the cup, with the paint resting on the rubber covering. Then, as the spout was sung into, the glass was moved round, and this design appeared. The picture on the right was made by singing louder and using moister paint. The cup with a spout or tube is called an eidophone, which means "form of the voice."



In the first picture, which shows the larynx, or voice-box, the vocal cords are in the position for producing a sound. The air is forced through the narrow slit, vibrating the cords. In the second picture the vocal cords are at rest. The epiglottis covers the larynx when we are swallowing.

THE VOICE-BOX AND ITS USES

CONTINUED FROM 3427

THE voice-box, or larynx, is not concerned alone with speaking and singing. It has important duties to perform every moment of our lives, because it is the channel of the breath of life. Further, owing to the way in which the lungs have been developed in long-past ages, it has happened that the opening from the throat to the voice-box lies in front of the opening from the throat to the gullet.

Everything we swallow, whether liquid or solid, must be thrown over the opening to the larynx without entering it. You see, then, that the larynx has another duty besides producing sound and attending to our breathing. It has to protect the air-passages every time we swallow. The larynx is made of pieces of what is called *cartilage.* Our ordinary name for cartilage is gristle, and we may describe it as something which is halfway toward bone.

We all know something at least about the larynx, because we have all seen the front part of it pushing the skin forward and sometimes moving up and down. There is an old notion that this is the apple which Adam swallowed and which stuck in his throat, and so it is sometimes called Adam's apple. A larynx, or voice-box, similar to ours is to be found in all the higher animals, and, as we know, it is simply a stringed musical instrument. In the case of the birds, many of which have such beautiful voices, there is, besides this stringed instrument, another, which is practically an organ-pipe.

The chief business of the larynx is to support and control the action of two tiny cords, or strings, called the *vocal cords;* that is to say, the voice cords. The pictures on this page show what the vocal cords look like when they are seen from above, both in readiness for producing sounds and in their normal state of rest.

All the air by which we live passes through the narrow space between the vocal cords. The arrangements by which they can be put together or separated are quite simple. They part every time we breathe in. When we choke and cannot breathe in, it is because the vocal cords are not parting as they should. But if the cords are to produce voice they must be able to do much more than this. It must be possible to hold them tightly stretched, so that when air is forced against them they will vibrate. It must also be possible to stretch them in different degrees. As we shall learn when we come to study sound, the pitch—the

shrillness or the lowness—of a musical note produced by anything trembling depends upon a number of things. Some of them are its weight, its length and its tightness.

Now, in the case of a piano, when we want to produce notes of different pitch we have a number of strings of different lengths laid side by side, so that we can strike the one that gives out the required note. Also, we can have some of them made of much heavier material than others. In the case of the violin it is possible to have only very few strings, but we can produce the notes we want by stopping the strings with our fingers. That is, the length of string that is free to vibrate can be altered as we please; and the strings are made of different weight and thickness.

But in the larynx there are only two strings, and these always act together. It is impossible to produce voice with one of them. Moreover, they are of the same weight and length. Outside the human body no musical instrument that has practically only one string, and cannot be stopped at different points like a violin string, is able to produce much variety of pitch. The only possible way of getting any variety would be to have some means of varying its tightness. It is probably correct to say that no material other than that made by life can be tightened in such different degrees as the needs of music demand, without permanent injury to the strings.

THE MARVELOUS POWER A GOOD SINGER HAS OVER THE VOICE

But though our vocal cords have only the one possibility of varying pitch, due to the fact that they can be tightened in different degree, with this one means they triumph. A good singer can produce all the notes in a range of two octaves, and many singers are able to do considerably more than this. Outside the body there is no parallel to this marvelous contrivance of nature.

How is their tightness varied? somebody is sure to ask. In front, just behind the part of the voice-box we see from outside, the cords are fixed to the largest cartilage of the larynx. Behind they are fixed to tiny knobs of cartilage delicately jointed to the part they rest on, so that they can be instantly tilted in several directions.

What really happens when we sing is that these knobs of cartilage are tilted backward, so that the cords are made tighter when our voice ascends in pitch, and are tilted forward, so that the cords are made slacker, when our voice falls.

WHY THE VOICE IS MUCH MORE MARVELOUS THAN A PIANO

When a singer is producing one of his highest notes the cords have to be so tight as to vibrate four times as often as when he is producing one of his lowest notes. In the whole range of nature there is scarcely anything more delicate than the control a singer has over this tiny machine to produce such results.

Nor must we suppose that the singer is limited to merely the number of notes that there are on the piano in two octaves. Pianos vary in pitch, as we know, and a singer can tune his voice to the pitch of any piano he sings with. Skillful singers can produce several tones, even as many as eleven, between two notes next to each other on the piano.

As we have said, all this depends on the tightness of the cords; the tightness depends on the strength with which certain tiny slips of muscle pull upon the cartilages to which the cords are attached; and that depends upon the force of the nerve-current sent to the nerves through these muscles from certain nerve-cells in the brain. The place, therefore, where the unrivaled delicacy of this machine really exists is the nerve-centre in the brain.

As everyone knows who has tried to read a song he is not sure of, or as anyone may observe who watches a child learning to sing, it is one thing to have all the machinery for producing a note that is easily within the range of our voice and quite another thing to be able to produce it. Even to imitate a note is a wonderful feat—it means the beautiful working together of the cells in the hearing centre of the brain with the cells of that part of the brain which gives orders to the muscles of the voice-box.

THE MYSTERIOUS FEAT OF SINGING AN UNKNOWN SONG

More wonderful still is it when a singer sings aloud the notes of a piece of music he has never seen before. What is it that he imitates now? What is it that guides him? We can only say that the singer imitates, or realizes, his idea of a certain sound that he has in his mind, but what and where the idea really is, and how the

singer can do what he does, no one can say.

It is very strange to think that some of the greatest music ever written—music which has made miserable people happy, cowardly people brave, frivolous people solemn, and will do so to the end of time—was written by Beethoven after he had become stone-deaf. He never heard a note of the greatest and most wonderful music he wrote; and yet in his mind's ear he must have heard it better than anyone has ever heard it since, or he could not have created it at all.

We now know that the larynx, or voice-box, the musical instrument which we all possess, produces notes of any particular pitch that we desire. But though singing is very delightful and precious, and though many books might be written upon the voice-box and its use in singing, speaking is really much more important than singing, and therefore it is necessary to study speaking from the point of view of the machinery by which it is done.

We have already learned about the wonderful centre in the brain where words and their meanings are stored, and we understand that everything else depends upon the orders given there. Now we must go on to study the machinery by which those orders are carried out. The voice-box is, of course, the central part of this machinery, but it is not all; and, indeed, everyone knows, who has whispered, that it is possible to speak without the voice-box altogether.

WHY IT IS THAT WE USE DIFFERENT NOTES IN SPEAKING

First of all, let us discover what is the difference between singing and speaking. In both cases we produce sounds by means of the voice-box, except in whispering; in both cases these sounds are musical notes—that is to say, the waves which form them are regular; in both cases there are changes of pitch.

No one speaks with his voice all the time on the same note, even in the shortest sentence. We raise the voice sometimes, we lower it at other times, as we go along, and we convey a great deal by the way in which we do this; so much so that children, and foreigners who do not understand the words we are saying, may learn a great deal from the pitch of the notes we use.

Even a dog or a horse will learn much from our voices in the same way. If anyone doubts that we use a number of different notes when we speak, let him get someone to say a sentence all on the same note, without raising his voice or lowering it. The Greek word for "one" is *monos,* and so, when something is spoken or sung all on the same note, we say that it is a "monotone," and thus we get the word "monotonous."

HOW WE ARE ABLE TO PUT COLOR INTO OUR VOICES

We could scarcely live with anyone who spoke in a really monotonous voice. Also, we use different loudnesses when we speak, and, apart from the actual note we are speaking on, we use different kinds of what is often called "color" in our voices. We speak to a child in a more tender tone than we speak to a bus-conductor, though we may speak more loudly to the child than to him. There are many different shades of expression which we can put into the same words spoken on the same notes and with the same loudness.

Now, the reason why it has been necessary to go so carefully into this is that we want to find out the difference between speaking and singing, and the first thing we find is that in all real points the singer does no more than the speaker does. He uses a variety of notes, he uses a variety of force, he uses a variety of colors. It may be added also that both singers and speakers use a variety of rhythm and speed.

But, nevertheless, no one will say that speaking and singing are the same, and everyone knows what it is to hear someone speaking in a singsong voice. There is a common word which has a very interesting history that bears on this point. It is the word "cant." We say that a thing is cant or that a person is canting when we mean that he is professing high ideas that he does not really believe. The word comes from the Latin *canto,* "I sing." Cant and chant are really the same word, and we might as well say that a person is chanting as that he is canting.

The explanation is that at a very interesting time in the history of England there were certain people with very strict views on many things who had the habit of speaking in a singsong way. When they spoke they chanted. Their enemies said that they did not believe what they professed, and so the word cant, which

really means "singing," came to mean "insincerity."

What happens when anybody speaks in a singsong way

Now let us ask what it is that happens when a person who was speaking in the ordinary way speaks in a singsong way, or actually sings. What happens is that he now produces notes which have fixed regular intervals between them, like the notes on a piano. When we speak we do not use the fixed musical intervals of pitch, but slide the voice up and down without taking any notice of the fixed intervals of music at all. It is true, also, that, as a rule, when we speak we may keep our voice within the limits of perhaps half an octave or less, while when we sing we may range over a couple of octaves or more. But though this is evident as soon as we think about it, it is not the real difference between speaking and singing, which is, that in singing we use only notes with fixed intervals between them, while in speaking we let our voice rest just where we please. If we think of a violin, we can perhaps understand this better. A player gets definite notes on the violin, such as the notes that are on the piano, by placing his fingers firmly on the strings at fixed intervals.

One of the great problems for the player is to get his fingers always at exactly the right places on the string. Now, when we sing, it is as if we were using just those intervals, only that, as we have seen, we get our notes, not by the violin player's method, but by tightening or loosening our vocal cords. If we do not use these intervals when we sing, people say that we are singing out of tune: they go out of the room as quickly as possible, and we are asked to sing only by people who have never heard us sing before.

Why different people have different kinds of voices

But the violinist can also move his bow across a string and make it sound, while, at the same time, instead of stopping the string at certain intervals, he slides a finger right along the string. So, as the string gets gradually longer or shorter he produces a series of notes —thousands in number really—which cannot be imitated on the piano. Now, our vocal cords can have any tightness or slackness, and so it is possible for us, as we speak, to pitch our voices at any point we like, just as if the violinist were to stop moving his finger at any point along the string of his instrument.

One of the great differences between voices is in the person's choice of the notes on which he speaks. It might be supposed that if one did not sing, it would make no difference what notes one used; but we all know that there are people to whose speaking voice it is a real delight to listen. It may be noticed sometimes that well-trained singers who sing quite well but are not really musical, speak unmusically; and everyone knows cases of people who do not sing at all but who have most beautiful speaking voices. To people with sensitive ears there is scarcely a greater delight in life than to be surrounded by people with beautiful speaking voices, and one of the reasons why we ought to study this question here is that we are running a grave risk to-day of losing the beauty of our speaking voices.

Great care should be taken of the voice in large families

One reason is simply the way in which we crowd together. It is probably safe to say that more pleasant speaking voices come from small families than from large ones. If we are one of twelve children and want to be heard—well, we are rather apt to discover which is the most piercing tone we can produce, and then perhaps we use that all the rest of our life. People should take great care of their children's voices in this respect, especially when there are many children and they all want to be heard at once.

A second special reason why voices lose their beauty is the growth of cities and their noises. The louder the noises around us, the louder and more piercing our voices have to be; and the music of them deteriorates, both in the quality of the notes and in the pitch of the notes. When there is a noise going on all around us we have no time to make our voices pleasant: we have to be heard. This question of noise naturally affects very much the voices of different classes of people. A person who speaks in a high-pitched, harsh tone—as if he scarcely expected to be heard, but meant to have a try—tells us something about himself and his surroundings. Contrast that with the woman who speaks in a voice rather low-pitched, quiet and musical. In so doing

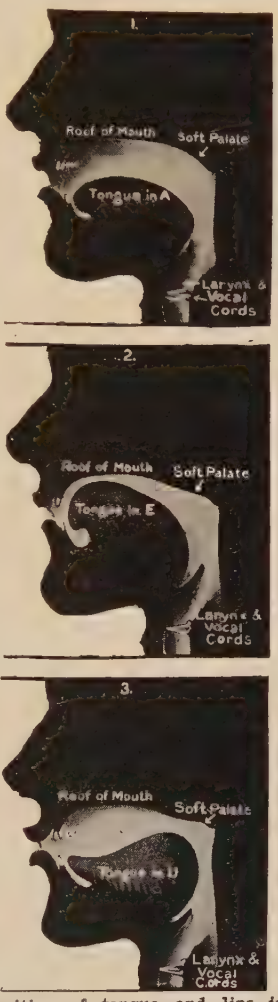
she almost tells us that she is accustomed to surroundings of peace and quiet, where people do not interrupt each other, where no one shouts, and that she, indeed, would rather not be heard at all than make distressing noises. In perhaps the most heartbreaking scene he ever wrote Shakespeare makes poor King Lear say of his youngest daughter, Cordelia:

"Her voice was ever soft,
Gentle and low, an excellent
thing in woman."

Cultivating a Soft and Gentle Voice

To some who read these words this may appear not very important; but if we wait until we are unhappy, or until we are ill, or until we have to live with one and the same person all our life, then we shall find out what a difference it makes. There are doctors and nurses who are worth far more than others are to their patients, not because they are more intelligent or more conscientious, but because they have the kind of voice that often goes halfway toward making a sick person well.

If the quality and use of the speaking voice were entirely a matter of the shape of the voice-box itself, then it would be quite useless to discuss this question; but, in point of fact, the results depend upon deeper things than these, and very often the voice expresses nothing less deep than character. Children are wise in this respect, and often make very good judgments about people by their voices.



Position of tongue and lips in pronouncing different vowels.

Every year thousands of dollars are spent on singing lessons and on listening to singers. That is all very well in its way, but it is a curious thing that so few of us trouble at all about speaking lessons or about making any conscious effort to speak nicely. Parents will cheerfully spend large sums of money on having their children taught to sing, and at the same time will allow those children to talk regularly in a way which would distress a dog. We already know upon what the pitch of the voice depends, and we know, too, that a tone of any given pitch may have different shades of color, or quality. At first this is not easy to understand, but it becomes clear as we study sound in some later chapters of the Book of the Earth.

Singing Different Vowels on Same Note

The fact is that when we speak or sing on a given note, that note is really a mixture of a large number of notes. The lowest of these is the principal one and is the one we hear best. But mixed up with it there are several others, called overtones, which color it and give it its quality.

We all know that it is possible to speak or sing any of the vowels on the same note. When we read this, we should quietly say or sing, *a, e, i, o, u* to ourselves on the same note—and of course these are by no means all the vowel sounds that there are. Now, if these are all on the same note, what makes the difference between them? The whole difference between the vowels consists of a difference in the number and proportion and comparative loudness of the overtones. When we sing *a* and *e* on the same note, the difference is that when we make the *e* we do something which alters the overtones that made *a;* and so, again, when we change the tone to *o* or to *ah,* or to any other.

If we carefully notice when we do this, we shall feel that something is happening inside our mouths. We are moving our throat in a different way; we change the position and the shape of the tongue, or, in some cases—as when we change the sound to *o*—we move the lips.

How We Can Make Different Sounds by Moving the Voice Organs

In all these cases the larynx is unchanged and the vocal cords are just

doing what they did at first; but we are altering the shape of the spaces above the larynx—the *resonators,* as they are called—and so the overtones are changed, and instead of the particular set of overtones which we have agreed to call *a,* there comes another which we have agreed to call *e,* and so on.

Children learn to make these sounds by imitation. That does not explain how it is done, but still it is done. Youth is the time for learning, and afterward it is difficult not only to learn new things, but also to unlearn what we learned in youth. Different languages have different vowel sounds. Probably, on the whole, no one of them is more difficult to learn to pronounce than the others. The question is really at what time in our lives we are asked to do so.

Every nation calls the sounds of the words of every other nation jaw-breaking for this reason. In English, for instance, we do not have the vowel sounds represented by the German *ü;* nor has our *o* exactly the same sound as the Italian *o.* So we find it very difficult to make those sounds when we try to speak those languages, and, as a rule, we do not make them rightly. We may talk very good German or Italian, but the German or the Italian usually knows that these are not the languages we learned from the cradle.

WHY A FOREIGNER SELDOM SPEAKS ENGLISH PERFECTLY

Likewise a foreigner may use English far more correctly and wisely than we do, but though he may live half a century in our country, and though he may be a very musical person, yet he rarely makes his vowel sounds quite correctly. The lesson of this is to teach us how marvelously delicate are the tiny movements of tongue and throat and cheeks and lips which decide the difference between *ham* as we say it and *ham* as a German, speaking English, says it.

Another of the consequences of the fact that children learn by imitation is that if people, as children, have unfortunately heard the vowel sounds not quite rightly made, it is hard work afterward to get them quite rightly. The number of possible vowel sounds is quite large, for every possible position of the parts of the body concerned in speech will alter, by affecting the overtones, the sound produced by the vocal cords, and so each of these positions will correspond to a different vowel sound. But, as we know very well, speech consists not only of vowel sounds, but also of consonants, like *b, c, d, f, g,* and so on, and of these also there is a large number.

THE DIFFERENCE BETWEEN A VOWEL SOUND AND A CONSONANT SOUND

The first thing for us to learn is what makes the difference between a vowel and a consonant, and there is no doubt at all as to the answer. The difference between a vowel and a consonant is the difference between a musical note and a noise—that is to say, the difference between a series of regular sound-waves and an irregular disturbance of the air. All the vowels are musical notes; to be more accurate, they are blends of many musical notes—the principal one and its overtones. Now, *i* and *o* are just as much musical notes as *a* or *ah;* but if, instead of saying *ah,* we say *ark,* we are using a consonant, and it takes very little time to prove that we are now making a sound which is not a musical note at all, but a noise.

For instance, the ear tells us the difference in pleasantness between a language full of harsh consonants, like German, and a "liquid" language, as we say, like Italian, where two consonants of different kinds are very seldom allowed to be next to each other, and where the most is made of the vowels. In general, the higher the proportion of vowels to consonants in a language, the more musical we call it.

SOME SOUNDS THAT NOBODY IS ABLE TO SING

Again, we know that it is possible to sing a vowel, and though we may sustain the note for many seconds, we are all the time quite certainly producing the sound of that particular vowel—if we sing properly. But no one can sing a consonant, because every consonant is really an interruption, and nothing else, to the musical tone produced by the larynx. We seem to sing the letter *m,* it is true; but, in fact, when we listen to ourselves, we find that after the first instant we are simply singing through our nose a note which is neither *m* nor anything else.

WHY A SINGER LIKES TO SING IN ITALIAN

The first business of the singer is to sing, that is, to make music. But the

singer must usually sing words, though sometimes he may sing for a little while a mere vowel like *ah*. Words are made up of vowels and consonants, that is, of sounds which are themselves musical and sounds which are the very opposite of musical. Some consonants, like *s*, are very unmusical; others, like *l*, are less so.

Thus the singer generally chooses a language like Italian, where the proportion of vowels to consonants is high, and when the consonants *do* come in, which, of course, they must if what he says is to be understood, he makes a point of dealing with them very quickly. Let them be definitely uttered so that the people may hear what is being sung; but let this be done very quickly, because they are noises interrupting the music—every one of them. When we begin to learn to sing we are all likely to try to sing on the consonants, and the first thing we have to learn is to do the singing on the vowels, which alone can really be sung. It is interesting to note that the air-waves made in singing, and even in speaking, will throw scattered powder into patterns, and on page 3554 are some pictures drawn by the human voice.

THE IMPORTANCE TO A SPEAKER OF PRONOUNCING CONSONANTS WELL

To return to speaking, the first business of a speaker, as contrasted with a singer, is to be understood; and when we come to study the words of any language we find that the differences between them are due more to consonants than to vowels. The rule for the speaker, therefore, is exactly the opposite of the rule for the singer. Whatever happens, he must make no mistake about his consonants. He must not drop his voice at the ends of sentences or at the ends of words. It may be just at the end of the word that the consonant comes which tells people what the word really is. The fortunate and rare speaker is he who manages to sound his consonants so clearly that he can be understood without sacrificing all the music of his vowels. It is a delight to listen to such a speaker, for he satisfies both needs of his audience—the need of pleasant sound and of understanding without effort.

You have, no doubt, heard several men or women speak to the same audience. It often happens that the wisest and most thoughtful of them all does not make as much impression upon his hearers as one who knows much less about the subject under discussion. Very often this is because the wiser man has a harsh or monotonous voice, or perhaps he speaks thickly and indistinctly, and therefore his hearers do not get all his meaning.

This does not mean that a pleasant voice is really more important than clear thoughts, but it is a great pity that men who think so often give little attention to the way they express their thoughts when they speak. The ideal to which we should all aspire is to have something to say and then to say it clearly and pleasantly.

We do not need to study the consonants very long before we find, either by noticing what happens in ourselves or by looking at other people, that they can be classed. Certain parts of the organs of speech are specially used in making one set of consonants, and other parts in making other sets. For instance, we notice that we make *p*, *b* and *m* with our lips, and so they are called the *labial* consonants, after the Latin word for "lip." The first two we make by a little explosion of the lips, the difference between them being due, not to the violence of the explosion, but to the quickness of it.

THE USE OF THE TONGUE AND THE TEETH IN PRONOUNCING WORDS

Then we notice that mainly the tongue is used in the making of such vowels as *l* and *r*. There is certainly no doubt about the *r* if we roll it. Then there are certain consonants where there is no doubt that we use the teeth, as, for instance, *d* and *t*, and these are called *dentals;* and there are others, such as the sound *ng*, in which we evidently use the soft palate—that is, the back part of the roof of the mouth. So we call that a *palatal* consonant.

The larynx has nothing to do with the consonants, for, as we have seen, its business is to produce musical tones. We have also seen that the quality of sound produced decides the vowel, and that this is decided by the position of the tongue, the lips, and so on. It follows that if we allow air to pass up between the vocal cords, but without using them, we can still produce all the vowels and consonants; in other words, we can whisper, and that is what whispering is.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 3683.

NAPOLEON AT FONTAINEBLEAU

Napoleon was one of the greatest conquerors and rulers that the world has ever known. By the unaided power of his great personality he rose from a poor Corsican boy to the position of ruler of all France—nay, almost all Europe. Here we see him at the beginning of his downfall, the first time he was forced to abdicate the throne. He is about to embark for Elba and is saying farewell to his soldiers, who idolized him. His parting from his generals at Fontainebleau, when he kissed the eagle on his standard good-bye, was one of the most pathetic scenes in a life of great victories and overwhelming defeats. He led them once more, but only to meet another great defeat.

3562

FRANCE IN THE REVOLUTION

CONTINUED FROM 3440

WHEN we visit Paris now, one of the first sights we wish to see is really not in Paris at all, but eleven miles southwest of the city. For although Paris is full of splendid buildings, palaces, museums and churches, there is nothing quite so fine in the beautiful city itself as the magnificent and historic palace of Versailles.

Let us now imagine ourselves there after the short journey of eleven miles by tram or train from Paris, and make our way first to a room called the Salle de l'Œil de Bœuf, or the Ox-eye Room, from its oval window, the shape of the eye of an ox.

Here, under the rich gildings and fine paintings, the courtiers in silks and laces were kept hanging round in idleness and vanity to see King Louis XV rise and put on his finery. Close by is the room in which the bad old king lay down to rise no more. The courtiers were near by when he died; and then suddenly there came a sound of scuffling and hurry through the great rooms and across the courtyard as they all rushed to the distant apartment of the king's grandson, now Louis XVI, and his wife, Queen Marie Antoinette. A by-stander tells us that the young couple fell on their knees together, and, with streaming tears, exclaimed: "Oh God, guide us, protect us! We are too young to reign!" They were not wise enough to reign in those troublous times. France of that day was like a sturdy youth who has outgrown his only suit of clothes, and no amount of whipping will keep him in it, no patching will make it cover him.

Many irritating customs had come down from feudal times, and of these the people wanted to be rid. The country was heavily taxed to pay for the expenses of the court, and for wars that were over—wars in which France had lost. But the nobles and the Church, who owned a large part of the land, did not pay the largest taxes. Thus a heavy burden fell upon the body of the people, while they had not the right to see that the money was not wasted. Instead of living on their estates, the great nobles spent their lives in Paris. That they might have money to spend on the pleasures of the court, they wrung every last penny that they could out of the unfortunate peasants, and there was much poverty and bitter wrong. Beyond all this, however, the king was an absolute monarch. But the people were no longer willing that his word should be law. They felt

they had the right to govern themselves, and to say how the taxes should be spent. France had outgrown its old government. It would have taken a great heart and a wise and steady head to give her a new one without trouble, and Louis XVI had neither.

At the beginning of his reign he had wise ministers, who tried to put the money affairs of the kingdom in order, and to arrange that the burden of the taxes should fall on those most able to pay them. But the queen did not like economy, and the nobles hated interference with their old "rights"—which were the people's "wrongs"; and timid Louis gave up his good intentions. All the time the rumblings of the coming storm, so long threatening, grew ever louder.

How the Kings and Nobles Feasted While the People Suffered

There is a story of Nero, one of the worst of the Roman emperors, fiddling while his splendid city of Rome was burning. Turn to Versailles, and you will see Louis spending his days in hunting or making locks. Some of these, and his tools, are still to be seen in the Palace Museum. And the queen? You will find her in the park, perhaps dressed up as a shepherdess, driving a flock of white sheep with ribbons round their necks, or playing at being a dairymaid in a little thatched farm. And all the time, as they trifled, as the nobles danced and feasted, their beautiful land of France was perishing from neglect.

We may read in Volume 2 how the French lost Canada, and how their vision of an immense continental empire across the ocean faded away as English colonies strengthened. When the American colonies would no longer bear the yoke of the mother country, France sent generous help to them in the struggle. When it was over, the French soldiers went home full of zeal for the truths contained in the Declaration of American Independence, feeling perhaps most deeply of all the words, "All men are born equal."

The States-General Meets After Long Interval

And so, to the influence of the words of the great writers and thinkers of the day was added that of the returned volunteers, who had seen with their own eyes what it meant to be free and equal and brotherly in a country where there were no nobles, no royalties.

Then France had to find money to pay for their share of the war which had won independence for the United States. No more could be borrowed or squeezed from the unhappy taxpayers, and at last Louis was obliged to call together the States-General, as they called the Parliament of France. As this was the first time for nearly two hundred years, six generations of Frenchmen had lived and died dumb concerning the government of their country. Great was the excitement during the election of the men who were to form the States-General. There were the representatives of the nobles and clergy, called the First and Second Estates; and the men who represented the great mass of the people—the men who worked either with hands or heads —who were the Third Estate. Lists of grievances were drawn up, also of needed reforms, and even the hopeless roused from their dullness of despair, for something was going to be done at last.

The Bursting of the Storm and the Beginning of the Revolution

One of the first things that happened was this. The Third Estate determined that its voice should be heard. Hitherto the custom had been for the representatives of the people to sit and talk and vote by themselves, and no one took any notice of their wishes. Now they demanded that they should sit and debate with the other Estates, and have an equal power in voting with them; and they had their way. The three Estates formed the National Assembly, and the chief wish of the people just then was that the king should govern according to certain laws, not by his own will alone; also that all should have a voice in the government.

Louis and his queen and court were terrified at the power thus seized by the Assembly, for the vain boast of Louis XIV, "I am the State," was now turned by the voice of the people into the declaration, "We are the State," and the timid and foolish king sent away the adviser whom the people most liked and trusted, and summoned German and Swiss troops to Paris and Versailles to keep the people in order.

And now at last the storm burst; it was the beginning of the Revolution. When the crowds in Paris heard the news

THE SINGING OF THE REVOLUTION SONG

Nothing roused more enthusiasm for the French Revolution than a song written in one night by an officer named Rouget de Lisle, who is here singing the song. It was sung by the men of Marseilles as they marched to Paris, and the people called it The Marseillaise. It has since been the national anthem of France.

When the starving crowds of Paris could no longer be restrained, they marched through the rain to Versailles, singing and shouting as they went and compelling all whom they met to join them. The artist has shown in this picture a lady of the nobility seized by the crowd and compelled to sing Revolution songs. The crowd broke into the Palace of Versailles and brought back all the royal family to Paris.

and rumors spread that the commander of the Bastille had orders to fire on the people, they became quite wild with excitement and rushed through the streets, robbing the bakers' shops, the wine shops, the gun shops; shouting "To arms!" and "Down with the Bastille!" Thousands of people attacked the hated prison, till the governor was forced to give in; he was killed in the streets, and the mob never rested till they had pulled down the thick walls that reminded them of the tyranny of kings.

The people now felt their power, and peasants in the country began to attack the castles and monasteries, so as to burn the deeds and papers by virtue of which their lords had so long oppressed them. It is not surprising that cruel deeds were done in revenge.

The National Guard that had been formed by the citizens to keep order in Paris was commanded by Lafayette, who had fought beside Washington in America, and they chose a cockade of red, white and blue. The time came when many in danger of their lives were saved by putting on this tricolor badge and shouting: "Vive la Nation!" "Vive la République!" as we should shout "Long live the Nation!" "Long live the Republic!"

How the women of Paris fetched bread from the king's palace

The National Assembly at Versailles was talking over plans for reforms, but at last the restless mob in Paris could be no longer held back, and early one October morning thousands of hungry women collected in the market place, crying out for bread. When it was proposed that they should go and demand it of the king at Versailles, they set off to walk in the pouring rain, followed by a great rabble, for eleven weary miles.

Lafayette had the greatest difficulty in keeping any sort of order, and in protecting the king and queen and their children, as the wet and yelling mob burst into the magnificent gilded and painted rooms of the three Louis. They insisted on the king's going back to Paris with them. What a procession! Fifty cartloads of the king's grain went first, and pressing before, behind and round the carriage windows of the royal family, thousands of the lowest and roughest sang and yelled and beat drums all the way to the Palace of the Tuileries. "We shall have bread enough now," they shouted, "for we have with us the baker and the baker's wife and boy."

That was the end of the glory of Versailles as a royal palace; for many years it has been the great national museum of "all the glories of France."

How the king betrayed the people and was found out

The National Assembly worked hard to arrange what they thought would be a better government for France. The old feudal provinces with their oppressive laws and customs were done away with, and eighty-three departments were formed and divided into districts which were to be governed by persons elected by the people. The property of the church was taken for the use of the state, and the clergy were to be paid by the government. All titles were abolished, and the king no longer could make laws or fix taxes, or decide peace and war.

The king agreed to this constitution, but good government could not be arranged all at once; bread was still dear, and people became suspicious of one another, and violence and disorder spread everywhere. Then the king and queen decided to try to escape from France and seek aid from foreign countries, so that Louis could put down all the new arrangements for reform, and make himself absolute king once more.

What beatings of heart must the royal party have felt in their large new yellow traveling coach when driving away from the Tuileries that summer night through the muddy country, all in the dark! It seemed for some time that all was well, but Louis was recognized, and the carriage had to turn back to Paris. Paris received them in silence, but the excitement was intense, and the news spread over the country that the king had betrayed them, and could no longer be trusted.

The red-cap procession to Paris singing the Marseillaise

When the Garde Nationale was formed in Paris, other towns throughout the kingdom formed similar companies of soldiers, and it was about this time that the Garde of Marseilles, right away in the south, on the shores of the Mediterranean, were called to Paris to prevent the king and the nobles' having their own

THE REIGN OF TERROR IN FRANCE

During the last fourteen months of the Revolution scenes like this were witnessed daily in the streets of Paris and other cities. Thousands of innocent victims were taken in rough carts to the place of execution, there to be beheaded by the guillotine, and as they passed along the crowds jeered and insulted them.

At last the people became tired of so much bloodshed, and some of the more cruel leaders who had ordered these wholesale executions were themselves put to death, and more moderate men took control of affairs. This picture shows some of the victims of the Terror; the jailer is reading the list of prisoners doomed to die.

way and undoing the great work of the Revolution.

Try to imagine the heroic march of these men, in the hot summer weather, their arms and uniforms shabby and dusty, with a banner in front bearing the words: "The Rights of Man." Some wore the red cap of liberty, with tricolor rosettes, some cockaded hats with waving feathers. Branches of trees, stuck in the gun barrels, sheltered the men from the sun. The drums marked step, and they sang as they marched the most inspiriting of all songs—The Marseillaise—now the national hymn of France, the words of which, to be found among the poems, have often been sung since by armies and vast crowds of people whose blood has been set tingling in their veins. As the men of Marseilles rolled out the words: "Allons, enfants de la Patrie"—"Come, children of our country"—the crowds they passed shouted back in excitement the chorus, as they picked it up: "Aux armes, citoyens!"—"To arms, citizens!"

THE WAY THE PROCESSION CAME TO PARIS, AND THE END OF LOUIS CAPET

Many joined them as they passed on through France, by Avignon, where the popes once lived for seventy years; by Lyons, now so famous for silk; over hills and dales, across wide plains, and so ever toward Paris, past the wide Rhone reflecting the red moon, past the nightingales singing in the woods, past the towns and the hovels and the castles, and the men at work on the threshing floors, past the blackberries in the hedges and the little wondering children, who sang back to the soldiers: "Allons, enfants de la Patrie." These 500 Marseilles men, who knew how to die, left on July 5. By August 10 they were in Paris, heading a furious attack on the Tuileries. The king and royal family escaped to the hall where the Assembly were sitting, but the faithful Swiss Guards were almost all killed doing their duty. It is to their memory that the famous lion at Lucerne, in their native country, has been carved out of the face of the rock.

"Is Louis Capet guilty of conspiring against Liberty? If guilty, what punishment?" were the questions now argued for four days in the Assembly. Capet was the family name of Louis XVI, recalling the line of kings—eight centuries long—descended from Hugh Capet; it was chiefly in consequence of their sins that Louis XVI was found guilty and condemned to death as an enemy of his country. He met his fate with the same calm courage as Charles Stuart had done over a century before in England.

HOW A GIRL OF FIFTEEN CAME TO PARIS AND HOW SHE LEFT IT

Not long after, the Widow Capet, as they called poor Marie Antoinette, of whom we read on page 2009, met the same fate. There is a bitter contrast in the way she came to France and the way she left it. We see a beautiful, high-spirited girl of fifteen leaving her home in Vienna to be married in a distant country. As she passed in pomp and state through sympathetic crowds, her tears flowed—it was hard to say good-bye for always, at fifteen, and she had many brothers and sisters. Little more than twenty years afterward we see a white-haired, sorrowful woman, with noble courage and dignity, standing in a common cart, her hands tied behind her, passing through yelling and insulting mobs eager to see her die.

Nearly all the nations of Europe rose against France on account of these doings of the Revolution, and the Convention that then ruled the country had hard work to manage the war. But they succeeded in driving back the invading armies.

In Paris, violent quarrels arose in the Convention. Some wished one sort of government, some another, and it ended in the strongest party's deciding that men must be forced to do as they wished, through fright and terror. The last fourteen months of the Revolution are called the Reign of Terror, and it is believed that at least 16,000 persons lost their lives in this awful time. Many others fled abroad.

WHEN THE CHILDREN OF FRANCE PLAYED WITH TOY GUILLOTINES

There is a handsome square in Paris now called the Place de la Concorde, then called the Place de la Révolution, and here a tall wooden machine called, after its inventor, the guillotine, stood always ready to cut off the heads of the condemned. No one was spared who was even suspected of not agreeing with the party in power. Children

NAPOLEON'S ARMY CHEERING THE EMPEROR ON THE BATTLEFIELD

Napoleon led his armies through many scenes like this, which shows us the battle of Friedland, against Russia—so terrible for both sides that if such slaughter had continued neither France nor Russia would have had any fighting men left. The French artist Meissonier here shows Napoleon's cavalry cheering the Emperor as they charge the enemy.

were given toy guillotines to play with, women wore brooches in the shape of tiny guillotines, and, worse still, women sat knitting and chatting in the square while the carts rumbled up and the heads fell. And not only in Paris, but in the towns of the provinces, guillotines were set up, and thousands of innocent people perished.

At last the terrible madness of killing showed signs of wearing itself out, and the more moderate party succeeded in getting some power. Marat, who had done so much to cause the horrors by the teaching in his newspaper, was killed by a young woman named Charlotte Corday, who thought it would be a noble deed to free her country from such a monster, and many others who had tried to force men to obedience by the terror of the executions perished by the guillotine even as their victims had done.

THE COMING OF THE BRONZE-FACED MAN IN THE MARTIAL CLOAK

The Reign of Terror came to an end when Robespierre and his followers were brought to the fatal steps of the guillotine. Robespierre had been a leader of the violent party all through, and could sway men by his clever speech and his absolute determination. There was, however, from time to time, fighting again in the streets of Paris. Royalists were trying to restore the monarchy. The Directors, who then had the duty of carrying out the new Constitution, chose a young artillery officer to lead the Republican soldiers against them. Citizen Bonaparte they called him. He had done well in defending Toulon, the naval station on the Mediterranean near Marseilles, and was now in Paris, looking on.

Let us take a good look at the clear-cut, strong face as the young officer gives the command to fire, and his guns roar and thunder round the Church of St. Roch. You can see the marks of the grape-shot on St. Roch to this day. No more resistance by insurrection for the time was possible. "Citoyen" Bonaparte was loudly called to be "General" Bonaparte, and from this time onward for twenty years this short, bronze-faced man became not only the most living power in France, but in Europe. All European history for these twenty years is troubled and overshadowed by the little sinister figure in the full martial cloak and the cocked hat..

NAPOLEON, THE MAN WHOM NOTHING COULD HOLD BACK

Napoleon Bonaparte was the son of a lawyer in Corsica, and had to learn to speak French at school; it is said that he always spoke French with an Italian accent. He had many difficulties to face before he could place his foot on the lowest step of the ladder of fame; but he overcame them because he was a genius, with abilities above ordinary minds, and he had an intense power of making others believe in him and adore him. When he once made up his mind that a thing was possible, no mere difficulties daunted him. He led his starving and ragged soldiers, when he first took up the command, to a series of brilliant victories in the pleasant, fertile fields of Italy, against the Austrians. Then, with his unerring eye, seeing how important Egypt was to the British on the road to India, he carried his troops there to fight the Mamelukes and establish a footing for France. "Soldiers," runs his well-known speech as he encouraged them under the hot sun, "forty centuries look down on you from these pyramids."

Fortunately for British plans, Nelson was able to destroy the French fleet in the battle of the Nile, and the victorious army had to stay for a time prisoners in Egypt. Napoleon himself returned in a single ship to France, and succeeded in changing the form of government, and in having himself made First Consul. As soon as he had shown he could manage the affairs of the country as well as he could lead an army, he dashed off again to Italy, which the Austrians had won back. This time we see him leading his men over the rocks and ice and snow of the St. Bernard Pass, cheering them on with the music of the band. How surprised the Austrians were when the army swung down upon the plains! The great victory of Marengo followed, but at the same time the army left in Egypt was defeated by the British.

FRANCE IS AT PEACE AGAIN, AND NAPOLEON IS CROWNED BY THE POPE

In the peace that followed, the First Consul found time to start many good works at home. Roads and bridges were

made, trade was encouraged, education was improved; French families who had fled in the Revolution times were allowed to return in peace; services were again held in the churches. Soon the time came when the Chief Consul succeeded in once more changing the form of the government of France, and this time he became Emperor—Napoleon I—and set up a splendid court, making princes and princesses of his brothers and sisters, dukes and marshals of his generals. He made the pope go to Paris to anoint him emperor at Notre Dame, and crowned himself and his wife Josephine with a beautiful golden laurel wreath.

Again Napoleon crossed the Alps, this time to be crowned king of Italy, with the famous iron crown of Lombardy.

Many traces of Napoleon are to be found in Switzerland, chiefly in the magnificent roads he made, or planned, over the mountain passes.

THE COUNTRY THAT NAPOLEON COULD NOT CONQUER

His next plan was to conquer England, but the "silver streak" of the Channel and the navy saved it; the large army gathered at Boulogne was finally marched off to help in the Austrian campaign. Another of Napoleon's great victories was soon won. After Austerlitz, the English minister, Pitt, said sadly: "Roll up that map of Europe; there will be no need for it for ten years to come," meaning that Europe was to be a battlefield for ten years more. Napoleon had now plenty of kingdoms to give away, and he made his brothers and his sisters rulers over some of the conquered states.

To ruin Great Britain, which had just won the important victory of Trafalgar, and which he could not conquer, Napoleon ordered all Europe to close their ports to British ships, so that no British goods could find a market. Most of the countries had to obey, and much loss and suffering followed. But Portugal refused to agree, and Great Britain sent an army to help her, under the general who was later the Duke of Wellington. The French were slowly and surely driven out of Portugal, and finally out of Spain across the Pyrenees. Napoleon's plan also led to war with Prussia and Russia, and although he defeated these countries at the battle of Friedland, after a terrible campaign, he was glad to make peace at Tilsit.

Soon after this Napoleon married an Austrian princess, and their little son was called the King of Rome from his cradle, as we read on page 148. Great was Napoleon's joy over his boy, for now he thought the empire was sure to last, and his son would reign after him.

HOW NAPOLEON MARCHED TO MOSCOW AND FOUND IT A CITY OF FIRE

By this time France was tired of incessant war, for thousands of the youngest and finest men were drawn away from their homes, often never to return; and money had to be found, for there is nothing more wasteful and useless than spending money on building battleships, and firing guns, and sending men away to be killed in fighting. But Napoleon wanted to punish Russia for breaking his decree about trading with England, and he led an army into the heart of Russia, to Moscow itself. The Russians could not prevent his doing this; but, as we read on page 2599, they burned their holy city, and destroyed or carried off all the food they could, so that the French had to start home again in snow and bitter cold winds. The retreat from Moscow is one of the saddest events in history. All France had been darkened by the shadow of the sword, as her youngest and strongest sons were drawn from their homes to fill up the ranks of the Grand Army, together with such Germans and Poles as could be collected on the way. Some 400,000 or more, with cannons and horses and bands, and wearing fine uniforms, set their faces bravely eastward.

THE STARVING TRAIL OF MEN IN RAGS, FOR WHICH FRANCE SUFFERS TO THIS DAY

A few months later, back on the same long route, there crept a starving trail of men in rags, in utter misery and dejection, for eight long weeks. And the rest? Burned in the fires of Moscow, left in Russian prisons, dead under the snow, or under the ice of the frozen rivers. For Napoleon, who till now never forgot, never failed to foresee and plan everything with wonderful skill, seemed suddenly to lose his great powers. He had forgotten how soon bitter winter comes on in Russia; he had forgotten that the army was thinly clad

and that stores of food must be had for men and horses; he had forgotten to make arrangements in case his plans did not turn out as he expected.

Napoleon left his army as soon as it was out of Russia, and hastened to Paris.

THE END OF NAPOLEON'S EMPIRE AND HIS FINAL DEFEAT

He soon had a new army ready for the field, but his downfall was at hand. Russia, Prussia, Sweden and all the German princes, except the king of Saxony, joined in a "League of Liberation" against him. In the early part of the new war he had some success, but even his father-in-law, the emperor of Austria, joined the league, and Napoleon was badly defeated in the Battle of the Nations at Leipzig, when for three October days he fought desperately to maintain the supremacy of the French. This did not end the war, but Napoleon was gradually forced back into France. His army in the south was driven out of Spain by the Duke of Wellington; and, seeing that the struggle was hopeless, the emperor went back to Paris and gave up the throne in favor of his little son. But this did not satisfy the other powers. They decided that his son should not reign. The crown of France was given to Louis XVIII, a brother of Louis XVI, and Napoleon was banished to Elba.

Within a year, staking a last throw, he escaped from Elba, and, raising an army as he went, marched back to Paris. Louis fled, and Napoleon reigned again for a brief period of a hundred days. It was only a flash of his old glory. On June 18, 1815, his best troops were beaten back by the British army under Wellington; and the Prussian army under Blücher completed the work by turning the retreat of the French into a scattered rout. Napoleon again abdicated, and after he had vainly tried to reach an American vessel, took refuge on a British warship. The allies decided that he should be banished to the desolate island of St. Helena, and there the great soldier wore out the rest of his days in useless repining.

AGAIN A MONARCHY UNDER THE FAMILY OF HER ANCIENT RULERS

Napoleon's conquests were all taken from France by the congress which met at Vienna to settle the affairs of Europe which he had upset, and Louis XVIII was again placed on the throne. Louis would gladly have gone back to the old order of things and ruled the country in the way that his fathers had done. But the old belief that the country belonged to the king was gone forever. A spirit of freedom and love of liberty had spread through the nation, and survived Napoleon's absolute rule, and Louis was compelled to grant a charter which recognized the doctrine that all men were free and equal before the law. This was not the only good thing that had come from the troubled times that the people had come through. If Napoleon had not turned his attention to conquest, he would have been a very great statesman, and all that was best in his rule was kept.

Louis died in 1824, and was succeeded by his brother Charles X. But Charles had so strong a desire to rule as a despot that in 1830 the people rose against him. Charles was deposed, and Louis Philippe, a descendant of Henry IV in another line, was made king.

Just before Charles was deposed, France had a war with Algiers, to punish the Dey, who had been behaving very badly. The Dey was banished, Algiers was placed under the protection of France, and this was the beginning of the French colonial possessions in Africa.

Louis Philippe, who had wandered about a good deal, and was very poor, professed love for the principles of the Revolution so that he might get the crown; but he was quite as anxious as his predecessors to return to despotic rule. In fact, at this time all the kings of Europe and their counselors were trying to hold back the progress of democratic government, and in every country but England and France they succeeded. Louis Philippe was compelled to grant the country a new charter and to promise to govern by it. He admitted that he was king of the French people instead of king of France, and he acknowledged that he was crowned by the will of the people. In spite of this, however, he betrayed his desire to be an absolute ruler, and this proved to be his undoing.

A PRESIDENT WHO BECAME AN EMPEROR

Ever since the Revolution there had been a party in France which thought that a republican form of government was best. This party grew in strength as the people realized that Louis Philippe was trying to gain more power. There

were a number of small revolts during his reign, and finally, in 1848, he was deposed, a republic was proclaimed, and the legislature proceeded to draw up a constitution.

There was a good deal of distress among the people, and the new government tried to overcome this by establishing, in Paris, national workshops, where everyone who was out of employment could find work. Naturally this curious but interesting experiment failed. Work could not be made for the numbers of workmen who flocked to the capital, and the workshops had to be closed.

Meanwhile another change of government was coming. Louis Napoleon, a nephew of the great Napoleon, had been chosen as one of the members of the republican legislature. He succeeded in winning the confidence of the people, and when an election for president was held by universal manhood suffrage in 1849, he was elected.

The new president meant from the first to become emperor, and used the presidency as a stepping-stone only. There was a good deal of disorder in the country which it was difficult to quell. This helped him to gain power, and within a few years he was able to overthrow the constitution and persuade the people to make him emperor. He took the title of Napoleon III, because the young son of Napoleon I had nominally reigned for a few days.

Very soon the constitution was in part given back. Napoleon's rule was mild, and for a time the people were content under the imperial form of government—the Second Empire, it is called. During the years that had passed since the Revolution, and in spite of all its political troubles, France had grown in prosperity. Napoleon fostered trade and commerce and manufactures. Paris was partly rebuilt and made the beautiful city that it is to-day, and the first of the great expositions was held in that city. Napoleon's reign was a time of splendor. If he had been able to keep out of war, all might have gone well; but this he did not seem to be able to do.

THE TRAGEDY OF A WAR THAT RUINED AN EMPIRE

The Crimean War, in which England joined with France in 1853 to save Turkey from Russia, was mismanaged, but Russia was defeated. Napoleon went to war with Austria in 1859 to help the Italians in their struggle for unity, and though he made peace with Austria too soon to be of great help to the Italians, he got Savoy and Nice for France in return for the assistance he gave. In 1862 he attempted to create an empire in Mexico, but this the United States would not allow, and he was compelled to withdraw his troops. The army, however, had not been beaten since Waterloo, and when the emperor allowed himself to be drawn into war with Prussia, the nation, as a whole, was sure of victory, and the soldiers, who thirsted for glory, marched gaily off to battle.

The result was disastrous. Bismarck, the great Prussian Chancellor, was anxious for a war with France, because he saw in it a means of uniting Germany, with the king of Prussia as its dominant lord. The Prussian armies, which had been victorious over Austria a few years before, were ready, and, as Bismarck was able to throw all the blame for the war on France, the princes of Germany rushed to Prussia's aid. Terrible defeats were inflicted on the French, who were not ready and were badly led. The emperor was taken prisoner with his whole army at Sedan; Paris had to endure the most dreadful siege in all its history, and the victorious Prussian king was proclaimed German emperor at Versailles.

Napoleon was deposed and took refuge in England, and since that time France has been a republic. The terms of peace imposed by Prussia were harsh and humiliating. Alsace and part of Lorraine were taken from France, and the country was obliged to pay an immense sum, called an indemnity, to the Prussians, and a number of French towns were held by Prussian and German troops as hostages until this sum was paid. To the surprise of the world, this was quickly done. The hostage cities were recovered, and in the years of peace which followed, the country regained more than its old prosperity.

THE STORY OF THE COMMUNE IN PARIS

Before order was restored, however, Paris went through another terrible experience. During the siege the government had been moved to Bordeaux, and as soon as the Prussian troops were withdrawn from the city it was seized by the mob. The people established a sort of

The beautiful Gothic Church of St. Ouen towers above the roofs at Rouen. It was formerly the church of an abbey dating to the Roman days and was reorganized in the seventh century. Different parts were added at different dates and the western façade flanked by two towers was not undertaken till 1846.

The Palace of the Popes on the Rhone at Avignon in which they lived during their so-called "captivity." This sombre collection of buildings looks more like a prison than a palace. It covers a space of more than one and a quarter acres. Begun in 1316 by John XXII, it was completed in 1370, and is in the Gothic style.

The splendid harbor of La Rochelle, a seaport of western France. The inlet of La Rochelle is protected by a stone mole built by Cardinal Richelieu which is visible at low tide. The harbor, which is one of the safest on the coast, is entered by a channel 2,730 yards long, and consists of an outer harbor with three adjoining basins. Not accessible to the largest vessels, it is used chiefly by fishing boats.

The Gothic Cathedral of St. André at Bordeaux dates from the eleventh to the fourteenth centuries. Both the north and the south façades are richly decorated with sculptured reliefs and statuary.

A quiet place in old Strasbourg, which in 1918, together with Alsace-Lorraine, was returned to France. As a place of great strategical importance Strasbourg has always been very strongly fortified.

government which is generally spoken of as the Commune, and held the city for months. They barricaded the streets, armed bands went about setting fire to some of the public buildings which had escaped the fire of the Germans. Notre Dame escaped, but the Palais Royal, the Tuileries and the City Hall were destroyed. Finally the soldiers fought their way into the city, the Commune was compelled to surrender, and thousands of the people lost their lives. Since that time Paris has never regained the great power in the country that it had before.

This is the beautiful Town Hall in Havre, which owes its importance as a war harbor to the two Napoleons. Havre was made the seat of the Belgian government during the Great War when Brussels was threatened.

THE PEOPLE DEFINITELY DECIDE TO HAVE A REPUBLIC

When the republic was declared, a provisional government was established, very much as in our own day a provisional government was established in Russia. This lasted only until a National Assembly was elected by the people. The Assembly chose Louis Adolphe Thiers as its president, and carried on the government until peace was made, the indemnity paid, and the last of the Prussian troops removed from the country.

After that, it seemed possible that the monarchy might be restored. But the heir of Charles X, whom a number of people desired to make king, refused to reign unless the tricolor, as the flag of France, was replaced by the white flag with the golden lilies of his forefathers. This foolish action settled the matter. To the great majority of the people, the "blue, white and red" stood for their adored country, for which their fathers and sons had fallen and died, and they would not have the man who scorned it to rule over them. The National Assembly quickly set to work to draw up and adopt a short constitution which settled the form of republican government, and the story of France of the Revolution was ended. This was in 1875, and, with a few amendments, the constitution as it was then passed still stands.

Napoleon died in 1874, but for a number of years the Imperialist party in France hoped that an opportunity might come to restore the empire, and place his son, the young Prince Imperial, on the throne. These hopes were destroyed when the young prince, while serving as a volunteer officer in the British army, was killed in South Africa, bravely fighting in the war against the Zulus.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 3813.

DOES LIGHT DIE AWAY?

CONTINUED FROM 3477

THE light of a star will disappear if the star grows cold and "goes out." Any star we see to-night may already have gone out, for the light we see it by left it long ago. Though light may be so steady and seem so permanent, yet we must think of it as we do of an electric current. Light really is a sort of electric current. It has to be made and kept up from moment to moment. To make light, a star must *spend power,* and if the new power is not forthcoming the light will cease, just as an electric current will cease if the battery runs down. So that light dies away if you do not continue to make it.

It is true, of course, that light often appears to our eyes to die away, but that is merely because our eyes are not strong enough to follow it beyond a certain distance, especially if the light is not very bright.

We can see lightning for very many miles; probably only the roundness of the earth prevents us from seeing it still farther than we do, for, of course, the time comes when the light, as it flashes through the air, will be cut off from the eyes of people far away, because they are, so to say, "round the corner" of the earth. In questions like this we must remember that light can travel any distance, and will, indeed, travel infinite distances so long as nothing stops it. Therefore, if the light remains bright enough for our eyes to be affected by it, we can see to the distance of the thing which is giving out the light. Thus, when we see a star, we see to a distance of billions of miles.

We know that the farther off a bright thing is, the less bright it seems. We know that the moon, or a planet like Venus, is brighter than the star to our eyes, though not a ten-thousandth part so bright in reality, because it is near. Yet light will travel on forever unless it is stopped. So far as we can judge, light as it travels suffers no loss at all. Of course, fog, which is made up of particles of water suspended in the air, and also dust or smoke may interfere with the rays, or even stop them.

Yet we know that somehow light gets fainter as it travels. The reason is that the light spreads in all directions as it travels, and so gets less intense at any particular place—as, for instance, where it strikes the curtain, or retina, of our eyes. The law governing this phenomenon is known exactly. If the distance is doubled, the light is one-fourth as bright; if trebled, one-ninth as bright; if quadrupled, one-sixteenth as bright. To get the intensity, we must take the square of the distance—that is, multiply it by itself—and then the intensity is so much less. We say that it varies *inversely* as the square of the distance. In other words, when a light is moved two yards away from us it seems one-fourth as bright to us; if it is moved ten yards, it seems only one-hundredth as bright to us.

HOW MUCH WATER IS THERE IN THE SEA?

Most of us know that much more than half the whole surface of the earth is covered with water, and if the earth had been of a slightly different size from the size it is, the whole of its surface would be one great ocean. A recent estimate of the extent of the ocean's surface may be trusted as a very careful and precise one.

It is rather higher than others we have heard, and now we may take it that *five-sevenths* of the earth's surface is covered with water. If now we could learn the average depth of the sea all over the world, it would need only multiplication to answer this question.

We find great variations in the depth of the oceans—places where the highest mountain might be buried, and great shallow areas, too; but the latest result of an enormous number of soundings taken in every part of the sea, except at and round the Poles, is that the average depth of the oceans all the world over is a little under two and a half miles. This is probably a great deal deeper than you would have thought, and it means a rather long multiplication if you want to learn the number of *cubic miles*. The scientists who went on the Challenger expedition estimated the amount of water in the sea at 323,722,000 cubic miles.

WHY DOES BLOTTING-PAPER ABSORB INK?

It is mainly a question of the surface of the paper. A very hard, very smoothly glazed paper will absorb scarcely any ink. If we write on such a paper, the ink takes a long time to dry; and what makes the writing is simply a layer of the solid matter left by the ink that lies on the outside of the paper.

All other papers absorb ink to some extent. Ordinary paper, such as these words are printed on, absorbs a good deal. The drying of the ink means that the water of it has evaporated into the air, while the solids that were dissolved in it remain in or on the paper. But a paper of loose texture, with a rough, unfinished surface, like blotting-paper, absorbs ink as a sponge sucks up water; and the water of the ink, instead of mainly remaining on the outside of the paper until it dries, runs into the substance of the paper, according to the amount of ink we use. That is why the letters are blurred when we write on blotting-paper.

CAN WE THINK WITHOUT WORDS?

There are some kinds of what is really thinking where the things which are put together or related are not words, but something else. Some men, for instance, in doing what is called algebra, can think without using words at all. They can find out, for instance, what this means: $A + B \times A - B$. Somebody has actually written to the editor asking him to have The Book of Knowledge written in figures as well as in words. Or, instead of thinking in words or figures, men can think in lines and angles and curves, and find out all sorts of wonderful things.

Euclid could think in this way about as well as anyone that ever lived. Other men can think in sounds. One of the greatest musicians that ever lived, Beethoven, wrote some of the most marvelous music in the world, which will be listened to as long as men have ears, long after he had become stone-deaf. He put the ideas of the sounds together in his head. He could think in notes as easily as you and I can think in words.

IS IRON HEAVIER WHEN IT RUSTS?

We have to find out what happens when iron rusts, and then we shall have the answer to this question. What happens is that the outside of the iron which is exposed to the air is burned or oxidized. A certain amount of the oxygen of the air is added to the iron, therefore. This oxygen, like everything else, has weight, and its weight must be added to the weight of the iron itself when the iron is rusty. Therefore, the answer to the question must be yes. The iron increases in weight by the weight of the oxygen which it has added to itself. But the rust, or *oxid of iron*, is friable, a Latin word which means "crumble-able."

The rust will crumble away under the influence of water or wind or anything else rubbing against the iron, and so the iron thing will lose not only the oxygen that it has taken into itself, but also the part of the iron which has combined with the oxygen. So an iron thing, when it rusts, loses weight, and that is very serious, of course, for it means that the thing loses its strength. And if an iron or steel bridge were allowed to crumble away in this fashion, it would soon break. That is one reason why we must keep such a bridge thoroughly painted.

IS THE COUNTRY MORE HEALTHFUL THAN THE TOWN?

The country should be more healthful than the town for two reasons. They are that the country gives us purer air to breathe, and more sunshine, as the country air is clearer and does not stop so much of it as town air does. On the other hand, the towns are usually much better off than the country in the matter of drainage and of water. Further, if people are wise and reasonable, it is better for their health of mind to see people, and to be not too much forced in upon themselves. In this way, the town is better than the country; and it is a fact that there is more insanity in the country than in towns. It is foolish to abuse cities blindly, as many people do. There never has been a civilization without cities. Athens and Rome and Jerusalem, to which we to-day owe almost everything, were cities.

The time will come when people will see this, and will try to make their cities as healthful as the country in air and sunshine. They will not allow smoke to make the air impure, and so they will get better air into their lungs and more sunshine; they will build all houses with gardens; they will stop the unnecessary noises of cities; and so will make places where men can meet, and hear each other speak, and discuss things, while still keeping the advantages of the country.

IS THERE A COLOR OUR EYES CANNOT SEE?

It is our brains that translate into color something outside them which we call waves of light. If there were no brains, those rays of light would still exist, but, plainly, it would not be proper to say that there were colors.

Now, what happens in the case of light is that, if we compare all the possible kinds of light to the notes on a piano, there is just about one octave in that large compass that our eyes can see. The notes above and below that octave are there, though we cannot see them.

If our eyes could see them, they would certainly be of different colors from the light that we can see. The notes below the red end of the octave that we can see would appear as some other color which, of course, we cannot imagine; and the notes above the violet end of the octave we can see would appear as another color. It has been clearly proved that some insects, such as ants, can see these rays of light beyond the violet to which our eyes are blind. But what color it looks like to them, no human being, of course, can ever tell. It is very interesting to know, however, that there are animals which can see notes of light which we cannot see, just as there are animals which can hear notes of sound too shrill for us to hear.

WHAT DOES "SAFETY FIRST" MEAN?

Safety First is a motto that has been very much used in recent years, and is a tribute to the growing appreciation of the value of human life. It originated as an industrial term, and was used in connection with factory life as a short and convenient way of reminding both employers and workpeople of the importance of taking every precaution against accident.

A Safety First movement began, and gradually the scope of the movement was extended to cover other spheres, as, for example, the crossing of roads, the entering and leaving of public vehicles, and so on. Notices are posted in motor buses and cars urging people to take care of passing traffic when getting in and out and to wait until the car stops.

The term rapidly became so familiar that its use was still further extended, as when a distinguished admiral, speaking of the importance of the navy's being adequate in size and equipment, summed up the need in the words of the motto "Safety First."

WHAT DOES A BIRD SING ABOUT?

Whenever a child or a bird or anyone else sings naturally, it sings about its feelings. If you have no feelings you ought not to sing. Sometimes we sing just to show that we are cleverer than other people, and when we do that we do not feel what we are singing, and everyone is glad when we stop. But the birds sing only when they must—when their feelings find their way out somehow. Then they try to tell the world how happy they are. The feelings that birds sing about are always happy feelings. When a bird is ill or miserable or unhappy, it never sings. It sings only when it is well.

Generally birds sing to express their feelings of love, and to call to their mates and their friends when they want company. At other times they sing simply for the joy of living, as the lark sings.

DOES A CLOUD WEIGH ANYTHING?

A cloud floating in the sky seems as if it had no weight, and we often use the expression "as light as a cloud" to describe anything very light indeed. But a cloud has actual weight, for it consists of particles of condensed water, and a good-sized cloud may weigh tons.

It may be asked why, if a cloud is heavy, it floats and does not fall. The answer is that a cloud only *seems* to float and that all the time the little drops of water in it are slowly falling. Even the drops of water in a fine mist are falling. Clouds are not only rain-clouds but *raining* clouds. When they seem steady and still that is because new drops of water condense and replace the falling drops, which often evaporate as they fall and never reach the ground.

WHY DOES A DUCK KEEP DRY IN THE WATER?

There are really several reasons. For one thing, the feathers which cover the body of the duck are so thick that the water on which the duck is floating does not come in contact with the air underneath the feathers, so that the skin is kept dry and warm. But this would not be enough by itself. There is a structure called a gland, which has an opening on the back of the duck near the tail. The business of this gland is to make oil, and this oil is used by the duck to smear over its feathers to make them extremely smooth and slippery. Oil and water will not mix, and so the duck, or any other water-bird, having covered its feathers with a thin layer of this oil, prevents the water from wetting the feathers. The skin of a duck also seems more oily than that of a chicken.

WHAT IS THE GROWTH FOUND ON MANY OAK TREES?

Cherry galls on oak trees, or oak-apples, as most of us call them, are the homes of insects. A little gall-fly pierces a hole in a twig of the tree and in it lays one egg or more. Either the irritation from the wound in the twig or the action of the egg itself causes the twig to form a hard and smooth growth round the egg. The egg hatches, and a grub appears. It eats the inside of the oak-apple, and then may bore its way out into the world, or may wait until it has changed into a perfect insect and then come out. There are scores of sorts of gall-flies.

WHY DO TREES NOT DIE IN WINTER LIKE FLOWERS?

This question depends on a mistaken distinction between trees and flowers.

A flower is only part of a plant; it is a special part, or organ, made by the plant for a special purpose, which is the production of seeds to produce new plants. We must not speak of the flower as if it were a plant. It happens to be conspicuous because the help of insects is required in the preparing of seeds, and the flower is a flag made to attract the insect's attention. But there are many flowers which do not require the help of insects. These flowers need not be conspicuous. All trees have flowers, and in most cases they are of the inconspicuous kind. But there are many exceptions to this rule, as we know quite well.

Once we know that trees have flowers, we do not need telling that these flowers die in the winter, just like the flowers of other plants. But the plant or tree does not die because the flower dies. The tree goes on living, and will produce new flowers next year; and that fact also may be true of many of the smaller kinds of plants in our gardens.

WHY CAN WE NOT SEE THE BOTTOM OF A RIVER?

When a wave passes from one kind of matter into another, part of it is usually turned back, or reflected. Light is a kind of wave, and it follows this rule. In passing through a window some of it is bent back, so that we can sometimes see our own faces in a window—as in the window of a railway carriage in a tunnel. The same thing happens when light passes from air into water; part of it is bent back, and it often happens that so much will be bent back that you will see the light from your own face as if you were looking in a mirror. If the light is coming in the right direction, you will often be able to see, not the light thrown back from the surface of the water, but the light thrown back from the bottom of the river.

HOW DO PEOPLE CATCH COLDS FROM ONE ANOTHER?

We give one another colds by passing on our cold-microbes. People are not nearly careful enough about safeguarding other people when they have colds. If we do not keep ourselves away from company, we should be careful about not coughing or sneezing or even speak-

ing opposite the faces of other people. The time will probably come when people who have colds will not be allowed to send handkerchiefs to the laundry, where now women daily catch all sorts of diseases from washing clothes.

DO MAGNETS EVER LOSE THEIR MAGNETIC POWER?

Every magnet, whether natural or artificial, tends, in time, to lose its magnetic power owing to a gradual, though outwardly unseen, rearrangement of the matter composing it. The power of a horseshoe magnet can be preserved by laying a bar of soft steel known as an armature across its ends to form a bridge between its two poles. A magnet with its armature in position is called a closed magnet.

HAS THERE EVER BEEN AN ACTUAL SHOWER OF FROGS?

Showers of frogs have been frequently reported; but most naturalists do not believe such reports. The frogs are generally found on the ground after a shower of rain, as if they had fallen; and it is much more likely that the rain has brought them out of their hiding-places than that they have come from the clouds.

Nevertheless, it is not actually impossible that frogs, especially small ones, may occasionally be drawn up into the air by a whirlwind which has sucked up the water in which they live. In such a case, of course, they would fall with the falling water. It is well known that fish are sometimes sucked up with water in this way, and fish weighing as much as three pounds apiece have been carried for hundreds of yards in the air.

Therefore, though it has not been proved that it ever "rains frogs," and though most cases reported of showers of frogs have not been "showers" of frogs at all, nevertheless it is possible that frogs may occasionally be sucked up by whirlwinds and then fall as if they were falling from the sky.

WHY DOES MANURE MAKE A PLANT GROW FASTER?

Do we know what growing is? This very wonderful and complicated process which takes place in plants and animals depends on proper kinds of food, and sufficient quantities of it, being supplied to these living things. If plants are neglected, or if children are half starved, they grow up puny, weak and ill-formed. The way to prevent that is to supply them with plenty of good food and fresh air. In addition, every kind of living tissue has a special kind of food which suits it better than anything else, and the more it gets of this kind of food the more perfectly it grows. What we usually call manure is more or less decayed matter—the bodies of other plants or other animals that have died.

This is just the food which is more nutritious than any other for plants and crops. So when the gardener or the farmer wants to grow his plants or his crops as quickly as possible, and to get the best he can, he finds out what kind of food suits them best. This he gives them in the form of manure. Nowadays there are many kinds of specially prepared substances which act in this way. Scientific men, by discovering these special foods, have shown us how to grow plants and crops in soils in which they would not grow before.

HOW DID THE GREAT COAL FORESTS COME TO BE BURIED?

Once upon a time, hundreds of thousands of years ago, there was no such thing as coal. But there were dense forests growing in swampy ground. The dampness in the air and earth encouraged the growth of plants of all descriptions.

Due to some change in the interior of the earth, some parts of the land surface slowly sank until they were under the sea. Hundreds of square miles of forest were included in this sunken land. Gradually sand and other sediment covered up the trees. But the weight of the water and the sediment, and the chemical action that went on in the wood itself when all oxygen was taken away, converted the wood fibre into coal.

Thousands of years later another change took place in the earth's surface. The former forests, now coal-beds covered with sand or clay, were raised above sea-level again. Fresh forests grew on the new soil. But again the earth's crust shifted, and the new forests went down under the sea to be converted into new coal-beds. Such changes happened several times in the history of the earth. How many times we can tell by the number of layers of coal we find, for each layer represents a sunken forest transformed into coal during a long, long period of time.

THE NEXT WONDER QUESTIONS ARE ON PAGE 3729.

In this glimpse of Alaska we see the morning mists and a sunrise over Tanana River, a tributary of the Yukon in northern Alaska. Alaska is a land of picturesque scenery, and it has a bright future agriculturally, industrially and commercially. Photo by Burton Holmes, from Ewing Galloway.

Photo, courtesy Matson Navigation Company, San Francisco.

Nuuanu Pali, north of Honolulu, is the "scenic lion" of the Island of Oahu. Its coloring is marvelous. The mountain walls force the gentle trade-winds through this narrow pass at almost a gale-like speed.

Photo, Wide World Photos.

The new concrete and steel school building on the island of Guam.

AMERICAN TERRITORY ACROSS THE SEAS

CONTINUED FROM 3408

YOU have learned how the people of the thirteen old states on the Atlantic climbed the mountains, floated down the rivers beyond, and then crossed the Mississippi River, the "Great Father of the Waters."

The wagon trains made their toilsome way over the plains, reached the summit of the Rocky Mountains, and, at last, came to the Pacific. By purchase, by exploration and by conquest we gained the territory which we now know as the United States.

SOME OF OUR POSSESSIONS IN MANY SEAS

For a considerable time this was all; but if you now look in the great atlas in the schoolroom or on your father's desk, you will find that our country holds much territory separated from the states of the Union. In the list you may find the following: Alaska, Aleutian Islands, Baker Island, Canal Zone, Guam, Hawaiian Islands, Howland Island, Midway, Wake and Johnston Islands, Philippine Islands, Porto Rico, Tutuila and the Virgin Islands.

Some of these names, I am sure, you have never heard before. Perhaps you remember when others became possessions of our country, or you can remember when some friend or relative went to work in Porto Rico, or came home from the Philippines; or when some friend came back from a visit to the Panama Canal. Then, too, you may have read that we have sent armies to Cuba. Yet Cuba is not on our list. We shall see what we have to do with that country soon.

ALASKA AND THE MANY ISLANDS AROUND IT

The first of our possessions in size and importance is Alaska, and the Aleutian Islands, which are really a part of it. The area is 590,884 square miles, according to the latest survey, which is about one-fifth the size of the United States proper, and about the size of the German Republic, France and Spain taken together. It cost, when we bought it from Russia, about two cents an acre; and yet some people said we paid too much.

It is a wonderful country of high mountains, great plains and broad rivers. From some of these mountains, great ice-rivers, or glaciers, slowly slide down to the sea. There huge sections break off and become icebergs. When your editor studied geography in school, the book said that Mount

St. Elias (over 18,000 feet) was the highest mountain in North America. Your geographies tell you that Mount McKinley (20,300 feet), which had not been measured or even discovered then, is the highest.

Along the coast are more than eleven hundred islands, known as the Alexander Archipelago. Some of these are high mountains with great forests on their sides. Stretching to the west more than a thousand miles beyond the mainland, and reaching almost to Asia, are the Aleutian Islands.

Through discovery by Vitus Bering, the country became a Russian possession in 1728. It remained so nearly a hundred and forty years, but it had never paid Russia, and so that country sold it to the United States in 1867 for $7,200,000. A few people in California and Oregon thought that the furs and the fisheries would be valuable to the country, but nearly everyone else laughed at the purchase of polar bears and icebergs.

So little attention was paid to the country that the United States did not even take the trouble to provide any sort of government until seventeen years later, though it was supposed to be under United States laws. During the year seal- and whale-hunters made camps on the islands stretching out toward Asia, and a few fishing-vessels touched the coast. Trappers and hunters wandered through a part of the country, but there were many thousands of square miles never seen by white men.

Gold is discovered and a rush to Alaska begins

Though stories of finding gold often came down the coast to Oregon and California, they did not cause much excitement until 1896. Then it was told that rich finds had been made on the Yukon River, in the region known as the Klondike in Canada, and thousands of people hurried there. Gold was also found on the American side, and in 1898 still richer deposits were found at Nome, on the western coast.

When the news of all these discoveries was carried over the world, another rush like that to California fifty years before occurred. Every old steamboat on the Pacific coast was pressed into service and carried struggling crowds toward the Golden North. Once landed, on foot, or with sledges drawn by dogs, they strove to make their way over the hills and across the streams toward the gold-fields. There were no roads, only paths called trails, where the snow had been beaten down by the feet of men and the runners of sledges. We shall tell more of this and also of the mines of coal, iron and copper.

Not all of Alaska is bitterly cold. The warm winds from the Pacific bring moisture to the coast, and the high mountains shut off the cold Arctic winds. Rain falls on more than two hundred days in the year. Great forests are seen, and the meadows furnish excellent hay. In much of the country our ordinary vegetables can be raised during the short, hot summer, and some grain also grows. But in the interior the temperature is often 50° below zero during the winter; and a few feet down, the ground is always frozen. Alaska is now organized as a territory of the United States.

Another possession where it is always summer

Far to the south of cold Alaska are some Pacific islands where it is always summer. These are the Hawaiian Islands, which were annexed to the United States at the request of the inhabitants in July, 1898. There are nine of these upon which people live, though one of them is almost deserted, and eleven smaller islands. The natives visit these tiny islands to gather the eggs of the sea-birds.

All the islands taken together are not large, as they contain only about 6,500 square miles. That is, all together they are larger than Connecticut but not so large as Massachusetts. The largest is Hawaii, but Oahu, which contains Honolulu, the chief city, has more people. Honolulu itself had 83,327 inhabitants in 1923.

These islands were made, the wise men tell us, by volcanoes which pushed up from the sea-bottom and poured out their lava. This decaying lava makes a rich soil, and since there is much rain, everything grows like magic. Some of the volcanoes are not dead. Kilauea, on Hawaii, is the largest active volcano in the world. The crater, that is, the bowl-shaped top of the mountain, is about nine miles around, and in the centre is a great lake of melted lava which rises and falls like water in a reservoir. At night the sight of this red-hot, quivering mass is one of the most wonderful sights to be seen anywhere.

Juneau, the capital of Alaska, is built on a gold-mine discovered in 1880. It has a population of about 3,000. Sitka, the oldest town in the territory, was formerly the capital, but that honor was transferred to Juneau in 1906.

Photo, Ewing Galloway.

The railway line along the old gold trail from Skagway to the summit of White Pass in Alaska is in a class alone for scenic grandeur. Here we see a train crossing a cantilever bridge on the White Pass and Yukon Railway line.

Photo by Burton Holmes, from Ewing Galloway.

EARLY EXPLORERS OF THE ISLANDS

These islands had been discovered by Spanish ships before the year 1550, but little notice was taken of them until Captain Cook, of whom you read on page 2571, visited them in 1778. He called them the Sandwich Islands, in honor of the Earl of Sandwich, and on his second visit quarreled with the natives, who killed him. Another brave British explorer, George Vancouver, who also explored British Columbia, left some cattle on the islands a few years later, and taught the people how to build boats.

American missionaries went to the islands in 1820, and soon the leading natives, who belong to the brown race, called themselves Christians. Many of the people still followed their heathen gods, and it is said that some do to the present day. The royal family died out, and Kalakaua was elected king in 1874. He was a very bad ruler, and tried to restore the idols and to take away the liberties from the people.

THE PEOPLE DRIVE THEIR QUEEN FROM HER THRONE

On his death, in 1891, his sister Liliuokalani tried to follow in his footsteps. By this time there were many white people on the islands. Some of them were the children and grandchildren of the missionaries, and others had gone there to trade. They put the queen off the throne in 1893, declared themselves under the protection of the United States, and asked to be joined to that country. This was not allowed at the time, but they refused to allow the queen to become their ruler again, and governed themselves as a republic. At last, in 1898, they were joined to the United States, and are now governed as newer states of the Union once were, that is, as a territory. They have a delegate in Congress who may speak but has no vote.

THE WHITE MAN'S WAYS PROVE FATAL

Since they were annexed, wealth has increased. The principal crops are sugarcane and pineapples, though rice, coffee, hemp, tobacco and bananas are grown for export. The greatest trouble is the scarcity of labor. The white man's whisky, as well as the white man's Bible, came in with the trading-ships, and many of the natives became drunkards. Then, too, the white man's diseases have caused the death of many. It always happens among uncivilized people that a new disease does more harm than it does among the people who are accustomed to it. The natives are now dying out, and less than 25,000 of the pure blood are left, and about 18,000 who are part Hawaiian. Once there were several times as many.

Many whites of Portuguese descent were brought in to work on the sugar plantations, but now they do work which is better paid. Then Chinese were brought in, and many of them have become prosperous farmers. They have in many cases married the native women, and their children are often good citizens. The Japanese came next, and though many of them stay only a few years before returning to Japan, their places have been taken by others.

The population of the islands is much mixed. The Japanese are more numerous (109,274) than any other race, but there are Koreans and Filipinos besides those already mentioned. In all, there were 255,912 people on the islands in 1920, of whom about one in five was white. These whites are of many nationalities, though there are more persons of American birth or descent than of any other. Japanese children born on the islands are American citizens.

THE SAD STORY OF THE LEPER ISLAND OF MOLOKAI

Perhaps you have heard of the leper island of Molokai. Leprosy is a terrible disease which slowly eats away the skin and flesh. It is said that it was unknown among the islands until brought from China about sixty years ago. Since 1865 all lepers have been sent to the island of Molokai, where they are well treated, and have good houses and abundant food. A well person may accompany a loved one, but may never return, and in many cases is attacked by the disease.

It was here that Father Damien, about whom you read on page 2320, lived and died. Now there are three churches on the island, and a home for boys and another for girls. These homes are supported and managed by a Catholic sisterhood of American women. Every effort is made by the Government and the churches to make life pleasant, but, after all, it is a living death.

Life on the other islands is pleasant in many ways. The climate is delightful, game and fish are plentiful, fruits and

SCENES FROM THE HAWAIIS

In Honolulu stands this statue of Kamehameha, first king of the United Hawaiian Islands, who founded his monarchy in 1790 by force of arms.
Photos by De Cou; copyright, Ewing Galloway.

This scene was photographed on the road through the giant tree ferns near Kilauea Volcano in Hawaii. Some of the ferns grow twenty-five feet high.

Here we see the Fish Ponds on the Island of Kauai, the "garden isle" of the Hawaiian group. The large lake at the right was used as a shark trap in the old days. The small pond in the centre is used as a natural aquarium.
Photo by Burton Holmes, from Ewing Galloway.

vegetables of many kinds are grown. One who has once lived on these islands always desires to return.

The natives are fond of games and sports of many kinds. Even the babies are good swimmers, and a favorite amusement is riding on a narrow board over the surf as it beats upon the shores. Nature furnishes food, little clothing is needed, and therefore most of the natives refuse to do much work.

Another group of islands and the savage inhabitants

Farther to the south and farther west is another group of islands over which our flag floats. These are the Philippines, named for Philip II of Spain, and first seen by Magellan. There are over seven thousand of them, but two are much larger than all the others taken together. Nine more have more than a thousand square miles each, while some are only points of rock. All together they have about the same area as Virginia, North Carolina and South Carolina. The population in 1918 was 10,350,640, of whom less than 12,000 were white.

There are many high mountains, with about fifty volcanoes. Twenty of these are alive. Earthquakes are frequent, and in many places the surface of the land is either rising or falling. The land is fertile, and great forests cover a large part. There are two seasons, the wet and the dry, and during the first some rain falls almost every day.

Natives black and brown; peaceable and savage

The first inhabitants were black, the wise men tell us, and from them the Negritos are descended. The Malays then invaded the islands, and after a time other Malay invasions drove the first into the hills. From this first invasion come the Igorrotes and other pagan tribes. These are the famous head-hunters. Some of their conquerors became Christians, and the seven great tribes of them are called Filipinos. Then another and later Malay invasion arrived, but this time it was the Mohammedan Malays, and from them are descended the fierce Moros. So one can say that the native inhabitants are the Negritos, the pagan Malays, the Mohammedan Malays and the civilized Malays.

The Moros would probably have conquered the islands if the Spanish had not come in 1565 to take possession. Not all the islands were conquered, but the Spanish tried hard to make all the people Christians. Both the Chinese and the Dutch tried to capture the islands, but failed. England took Manila during the French and Indian War, but gave it back at the end of the war.

The battle of Manila Bay won by Commodore Dewey

You may read on page 3944 of what we call the Spanish War. When the United States declared war against Spain, Commodore Dewey, with an American fleet, sailed into Manila Bay and destroyed the Spanish fleet on May 1, 1898. A few weeks afterward the city itself surrendered. When peace was finally made, the United States kept the islands, but in return paid Spain $20,000,000.

Just at this time the Filipinos, under Emilio Aguinaldo, had been fighting for their freedom. When they found that the United States did not intend to grant their independence at once, they revolted against this country, and were not conquered for several years. Finally Aguinaldo was captured, in 1901, and his followers gave up.

The United States has announced that when the people are prepared for it, independence will be granted, but many of the Filipinos think they are ready now. The governor is appointed by the president of the United States, and gradually a larger and larger measure of self-government has been granted to the people. The islands are represented in Congress by two commissioners who may speak but may not vote. William H. Taft, later president, was the first governor, and did much to start the machinery of government running smoothly.

What the islands produce; why they do not produce more

The resources of the islands are very great. Gold, silver, iron, lead, zinc, copper, sulphur, petroleum and salt are found. Marble and asbestos are also found. The production of gold is not very important. The timber is very valuable, and includes many kinds so hard that they cannot be cut by ordinary saws. Some of these take a high polish. There are thousands of coconut-palms, as you see in our pictures.

The most important article sent out from the islands is hemp, about which you are told in the story of a rope. Next

SCENES IN THE PHILIPPINES

The methods of farming have not changed very much for centuries. The buffalo, or carabao, is the chief beast of burden, but some farm machinery has been introduced by American planters. Mayon is one of the most beautiful volcanoes in the world. The town at the foot is Legaspi, island of Luzon.

Thousands of the people of Manila live in houseboats moored in the Pasig River, as our picture at the left shows. The picture on the right shows a village of the Igorrotes, a fierce and bloodthirsty race. Not so long ago they prized as trophies the heads of their enemies, but this has almost died out.

© Keystone View Co.

Photo, Kadel & Herbert.

The coconut-palm furnishes food, drink, oil, timber and rope. A tree produces about a hundred nuts a year. Here you see a grove with nuts piling up ready for market and a load of them on the way to Manila.

come copra, or dried coconut-meat, and sugar from the sugar-cane. Good coffee is grown, and the cocoa tree is also found. Philippine tobacco finds many admirers. Indian corn grows well, rice is a good crop, and sweet potatoes form a large part of the food of the people. The soil is rich, and could produce even larger crops. White men have trouble in working in the climate, however, and the natives work as little as possible.

Since a very little labor will produce enough for their simple wants, they take many holidays. They do not like to use new tools. If you look at the plow in one of our pictures, you will see that it is only a forked stick. Many Filipinos have little desire to improve their condition. Wonderful changes have taken place since the Americans took charge. There are now two universities, many good schools and good roads. Machinery is being introduced, and many families are becoming prosperous.

Spain's failure to build an empire in the west indies

Now we turn to the Atlantic Ocean, where are other possessions of our country, also gained in the Spanish War. But let us see first what this war was. Spain at the end of the nineteenth century still controlled Cuba and Porto Rico, but the Cubans were very restless. Many times they revolted, and the revolts were put down, but only for a little while.

In 1895 a fresh rebellion began. Spain had learned nothing by experience, and attempted to crush this revolt by strong measures. General Weyler, who had been governor-general of the Philippines, was put in charge, and began to burn the houses and crops, and to drive the people into the towns, where they were kept prisoners. President Cleveland objected, but was told that he must not interfere. The anger of the American people grew, and Spain removed General Weyler, but no other change was seen.

The Maine is destroyed in Havana harbor and war follows

Finally, when one of our battleships, the Maine, was in Havana harbor, she was blown up, February 15, 1898, and more than two hundred and fifty lives were lost. It was believed that a mine had been exploded underneath her, and the people demanded that Spain be punished. President McKinley tried to avoid war, but did not succeed, and on April 19 Congress declared that Cuba ought to be independent.

The first victory was the capture of Manila by Commodore Dewey. Troops were landed on Cuban soil on June 22, and the next day, and again on July 1, battles were fought near Santiago. A Spanish fleet, under Admiral Cervera, which had come from Spain and entered the harbor of Santiago, suddenly came out, July 3, with the hope of escaping the blockading fleet. This fleet, under Commodore W. T. Sampson, with Commodore Schley second in command, followed, and a running fight took place. One by one the Spanish ships were either sunk or set on fire and run on the shore. After the fleet was destroyed, Santiago soon surrendered, with 23,000 men.

The island of Porto Rico captured and held

General Miles was sent to Porto Rico, another Spanish island east of Cuba, with a force of 17,000 men. This force had little fighting to do, and soon the whole island was in American hands.

No European nation believed that the United States would keep its promise not to retain Cuba. For a time soldiers were kept there, and General Leonard Wood acted as governor. Schools were established, roads and telegraphs were built, and war was declared against yellow fever. It was discovered that the disease was carried from a sick person to a well one only by a kind of mosquito. So the seaports were made clean, and all places where mosquitoes could breed were looked after.

What Cuba lacks of being entirely independent

Then the Cubans were offered control of their government if they would do the following five things: (1) Cuba must make no treaties with foreign powers which would hurt the United States; (2) the United States may preserve order if the government fails; (3) the country must not go too deeply in debt; (4) it must give to the United States places on its shores to keep coal for the warships; (5) the ports must be kept clean, so that yellow fever cannot get started. You see, the island is so close to the United States that a ship may easily carry the disease to our southern ports.

The Cubans agreed, formed a constitution, elected their officers, and took charge of their government in 1902. For a while

GLIMPSES OF MANILA, OLD AND NEW

In 1571 the Spaniards founded Manila, and we find traces of their influence in the architecture of the older part of the town.

Our picture shows a view looking out through columns of one of the public buildings in Manila. The cathedral towers are seen in the distance.

Street cars, automobiles, telegraph lines and many other modern conveniences have made Manila an up-to-date town to all outward appearances. The palms and the tropical climate, however, remind us that we are in the Far East.

Photos by De Cou; copyright, Ewing Galloway.

all went smoothly, but soon an army was raised to drive out the president. In 1906 the United States sent troops again, and kept order until the country became quiet. Then another president was elected, and the army was taken away in 1909. So you see that Cuba is not quite free and independent.

But what of the other islands we took from Spain? Porto Rico was visited by Columbus on his second voyage, and later Ponce de Leon, the explorer of Florida, became governor. Negro slaves were brought in, and the Indians gradually disappeared. For a little while the island was held by the English, but afterward was returned to Spain. While Cuba was fighting for independence, Porto Rico was restless but did not declare open war.

PORTO RICO, A WINTER PARADISE FOR TOURISTS

The island contains about 3,500 square miles, which means that it is over two-thirds the size of Connecticut. Three other small islands belong with it. The climate is pleasant, though hot except in the mountains, and the soil is rich. There are large forests of good timber, and the coffee tree grows well. Sugar-cane and tobacco are the largest crops, next to coffee, but cotton is grown also. Oranges, lemons, limes, grapefruits and pineapples grow wild.

The population in 1920 was 1,299,809. About three-fourths of the people are white, and the others have more or less negro blood. Except in the towns, there are few educated people, for, when the United States took the island, only sixteen or seventeen persons in a hundred could read and write. Our Government has built many new schools and a university, and more and more children go to school. Nearly half the people can now read. The people have been given a large measure of self-government.

There is little to be said about Guam. It was taken because we needed a coaling station for warships. It is very much like the Philippines in soil, climate and population. Very few whites live on the island. The governor is a naval officer.

THE ISLANDS ROBERT LOUIS STEVENSON LOVED

Since we have been naming our chief possessions in the order in which we gained them, we now go back to the Pacific, where there are so many wonderful islands. One particularly beautiful group is the Samoan, or Navigator, Islands. They were discovered in 1768 by a French sailor, De Bougainville, but France never made any settlements. In 1839 Charles Wilkes, an American naval officer, surveyed the islands and made a sort of treaty with the chiefs.

Great Britain and the German Empire next began to be interested in the islands, and in 1889 these nations and the United States made an agreement to protect the native king. This king died in 1898, and the three nations could not agree about several matters. In 1899 the islands were divided between the United States and the German Empire. The United States took Tutuila and the Manua group, all together about sixty square miles. These islands are important only because of the harbor of Pago-Pago on Tutuila. This is one of the best harbors in the Pacific Ocean, and would be useful in case of war. German Samoa is now managed by New Zealand.

LIFE ON THE SAMOAN ISLANDS

The people are brown-skinned, tall and strong. Many of the girls are very beautiful. The climate is mild. Everything grows almost without labor, so that there is time for dancing, singing, feasting and church-going (for nearly all of them are Christians). Robert Louis Stevenson spent his last years in the Samoan Islands, which he grew to love with all his great heart. The islanders sell cotton, sugar, coffee and coconuts, but as there are only about 8,000 people on Tutuila, you can see that the trade cannot amount to very much. A naval officer is the governor.

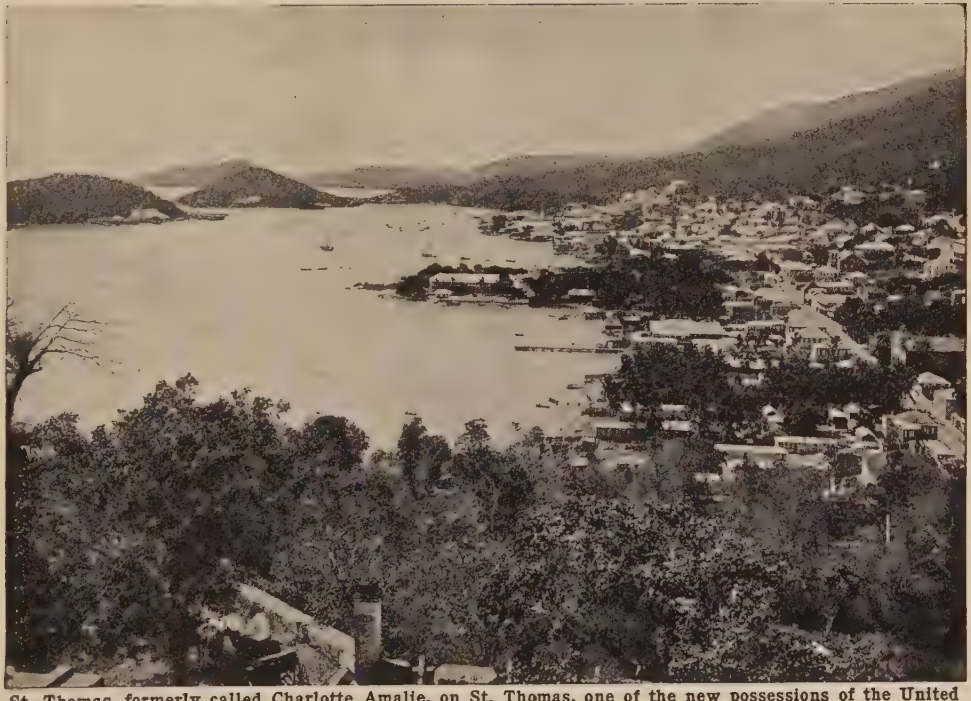
While the United States was getting possession of so much foreign territory in 1898–99, it also picked up some small islands. Strange to say, there were a number of small islands in the Pacific which had never been claimed.

AN ISLAND ON WHICH NOTHING GROWS

Midway Island, for example, is coral sand. Nothing grows on it, and the only residents are cable-operators and a squad of marines. The servants are Chinese or Japanese. Three or four times a year a boat stops to leave supplies and orders, and bring books and newspapers. When it goes, the few inhabitants settle down for another three months of quiet.

Now what is the Canal Zone? We shall not tell you much about the Panama

Aibonito is not one of the largest towns in Porto Rico, but its situation on the hills is very attractive. You see in this picture a strange mixture of the old and the new. You see the old style of architecture and some ugly new buildings; a motor car and native carts and packhorses. Telephones are everywhere.



St. Thomas, formerly called Charlotte Amalie, on St. Thomas, one of the new possessions of the United States, has a beautiful harbor. The island was once much larger than it is at present, and what is now the harbor was then the crater of a volcano. As the island sank into the sea, water ran in at one side. The town makes a gay show with its pink, yellow and green houses with red roofs among the trees.

Canal now, as we have a long story about it. It is enough to say that the Republic of Panama in 1903 leased to the United States a strip of land five miles wide on each side of the canal. Over this the United States has entire control for a hundred years, and then may continue the lease. The city of Colon on the Atlantic side, and of Panama on the Pacific side, do not belong to the zone. The United States has been given the right to see that the cities are kept clean, however.

time Alaska was purchased, but Congress would not agree. The need of the harbor became greater after the Panama Canal was opened, and in 1917 the islands were transferred to the United States for $25,000,000. This seems a high price for a small territory, but if the United States had not bought the islands, some unfriendly European power might have done so, and threatened the canal, our gulf cities and Porto Rico.

The inhabitants of the islands are nearly all negroes, but most of them

Photo Press Illustrating Service, Inc.

This is the Normal School at Manila, Philippine Islands, with the women's dormitory. Nothing shows more clearly what the United States has done for the islands than the provisions made for education of every sort. There are more than 4,000 schools in the islands, and teachers must be prepared. There is also a university with a large attendance, and many industrial schools, which teach the Filipinos how to use their hands.

THE VIRGIN ISLANDS, OUR NEWEST FOREIGN TERRITORY

The latest additions to the territory of the United States are three of the Virgin Islands in the West Indies. St. Thomas, St. Croix and St. John, three tiny islands containing all together only about 132 square miles and a population of about 27,000, belonged to Denmark for a long time, but were an unprofitable possession, and that country was willing to sell. There is an excellent harbor on St. Thomas, and the naval authorities of the United States long desired it as a base for warships. The islands could have been bought for $7,500,000 about the

speak English, and were glad to become a part of the United States. Much of the land is mountainous, but there are some fertile plains on which sugar-cane and tropical fruits grow well. The bay tree flourishes, and St. Thomas was noted for the production of bay-rum, which your father may use after shaving. A stock farm and a tobacco-shipping factory have been established in St. Thomas, and a lace industry is being established among the women and children. Both St. Croix and St. Thomas have powerful radio stations. The largest town is St. Thomas, formerly called Charlotte Amalie.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 3773.

ALONG THE PANAMA CANAL ZONE

Sugar-cane grows in Panama, and on the left we see a rude sugar-making plant. The cane is crushed between rollers, and the juice is boiled under the shed. The house on the right is the home of a native family.

Although not included in the American Territory, the island of Taboga is interesting for its old churches and buildings. Photo, Ewing Galloway.

This is Steamship Row, Cristobal. Formerly this port was part of the city of Colon, which is not in the Canal Zone. Photo, Ewing Galloway.

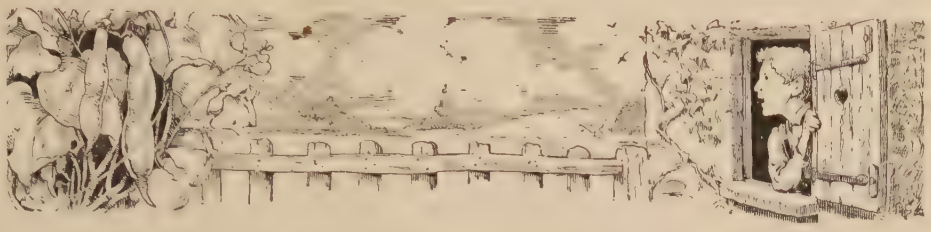
The port at the Caribbean entrance to the Panama Canal is Cristobal, and that at the Pacific entrance is Balboa. Here we have a view looking down from Balboa over the entrance to the canal.

YOUNG AMERICANS OF THE WEST INDIES

The town of Charlotte Amalie on St. Thomas is built on the harbor side of three high hills. Many streets for foot-passengers like these connect the different levels. Vehicles must wind around the hills. These young Americans are on their way down to the water. All learn to carry burdens on their heads.

The population of Porto Rico is chiefly white, but there are many negroes, and more of mixed blood. Some of the people show white, negro and Indian descent. Some of these races are shown in this picture of lace-makers. Girls begin to make lace when very young, and some learn very beautiful patterns.

Pictures on pages 3593 and 3596 copyright by Newman Traveltalks and Brown & Dawson, New York.



JACK AND THE BEAN-STALK

CONTINUED FROM 3445

A VERY poor widow once lived with her only son Jack in a little cottage on the border of a great wood. They were so poor that often Jack went supperless to bed; and at last things became so bad that Jack's mother made up her mind to sell their cow, the only possession they had left. So, when market-day came round, Jack set out, driving the cow before him, determined to make the best bargain he could.

On the way he met a man with a bag of beans in his hand. Jack took such a fancy to the beans that he begged the man to give them to him.

"No, indeed," replied the man. "They are magic beans. But you shall have them in exchange for the cow."

To this the boy readily agreed. The man took the cow, well pleased with his bargain; and Jack ran home to show the beans to his mother. The poor woman wept when she heard the story, and was so angry at Jack's stupidity that she flung the beans out of the window.

Jack went to bed very cross that night, but when he got up the next morning he was surprised to find something in front of his window. It looked like a huge tree; but, on going nearer, he found that during the night the wonderful beans had twined together and grown to a tremendous height; indeed, the top of the stalk was almost out of sight.

In a twinkling Jack sprang up the bean-stalk. Higher and higher, and still higher he climbed, until he began to lose his breath. When at last he reached the top, he found himself in a strange country. He walked along a little way and presently met an old woman.

Jack had never seen her before; but, to his great surprise, she said: "I know you quite well, Jack. Years ago a wicked ogre killed your father and stole all the money which should rightly belong to you. This ogre lives close by; and if you want to punish him, I can help you."

Jack replied that he certainly did want to punish the ogre, and asked where he lived.

"In that great castle over yonder," replied the old woman, who was a witch, and with that she vanished.

Jack made his way to the castle which the old witch had pointed out, boldly mounted the steps, and rang the bell. A woman opened the door; and Jack asked for a night's lodging.

"Alas!" replied the woman, "I dare not take you in. My husband is an ogre, and if he finds you he will surely kill you and roast you for supper."

"But can you not hide me?" asked Jack, who was no coward.

"I will do my best," said the woman; "but you must promise to go away the first thing in the morning."

When Jack had promised, she took him into the kitchen and gave him a good meal; but before he had finished, came a loud knock at the door.

"Quick!" cried the woman. "Jump into the oven, and don't make a sound till my husband has gone to bed."

In scrambled Jack, and a minute later the ogre strode into the room.

"Wife," he cried out, in a terribly loud voice, "I can smell fresh meat!"

Jack trembled at the voice of the ogre. "Nonsense, my dear!" he heard the wife say. "See what a fine supper I have prepared for you."

The supper was so good that the ogre instantly sat down and made a good meal, and when he had finished he told his wife to bring in his favorite hen. She went outside and returned with a beautiful hen, which she set down on the table.

"Lay an egg!" commanded the ogre; and the hen instantly laid a golden egg.

"What a useful bird!" thought Jack.

Soon after this the ogre fell asleep, and snored so loudly that his snores shook the walls. As soon as Jack heard them, he crept out of his hiding-place, picked up the hen, and ran away. On and on he ran until he reached the bean-stalk, which he climbed down as fast as ever he could go. When he reached the bottom he flew to his mother and told her what had happened. The widow was overjoyed, and called Jack her "brave boy." They sold the golden eggs which the wonderful hen had laid, and lived very comfortably for some time on the money they were able to get for them.

Jack reached the bean-stalk, and began to climb down with the harp, while the ogre followed in hot pursuit.

But after a while Jack began to long for more adventures. So one day he disguised himself as well as he could, climbed up the bean-stalk, found his way to the castle, and again asked the ogre's wife to give him food and lodging. But the woman shook her head, and said that the last time she had befriended a poor boy the ungrateful wretch had repaid her by stealing the ogre's favorite hen. But Jack begged so hard that at last she consented, and this time hid him in a cupboard.

Presently the ogre returned to the castle. As he entered the kitchen he cried out in a terribly loud voice: "Wife, I smell fresh meat!"

"Nonsense, my dear!" replied his wife, as before. "See what a fine supper I have prepared for you."

The ogre sat down and ate his supper. When he had finished, he roared: "Bring me my money-bags!"

His wife brought the bags and laid them on the table. The ogre counted his money, put the coins back into the bag, and then fell asleep. Out jumped Jack, caught up the money-bags, ran out of the castle, and was soon back again in the cottage.

"You need not mind spending all this money, mother," he said, pulling the bags out of his pockets one after the other, "for that bad man stole it from my father, and it is all our own."

Some time after this Jack once more climbed the bean-stalk and made his way to the castle. This time he dare not let the ogre's wife catch sight of him, but after waiting about for some hours he managed to slip in and conceal himself in the boiler just before the ogre returned.

"Wife, I smell fresh meat!" roared the ogre, directly he set foot in the kitchen.

"Oh, no!" replied his wife. "You are always fancying there is something in the house. This time I am certain you are mistaken."

When the ogre had eaten his supper, he called for his harp. His wife brought it and set it on the table, and at a word from the ogre it began playing by itself. This so pleased Jack, who was peeping

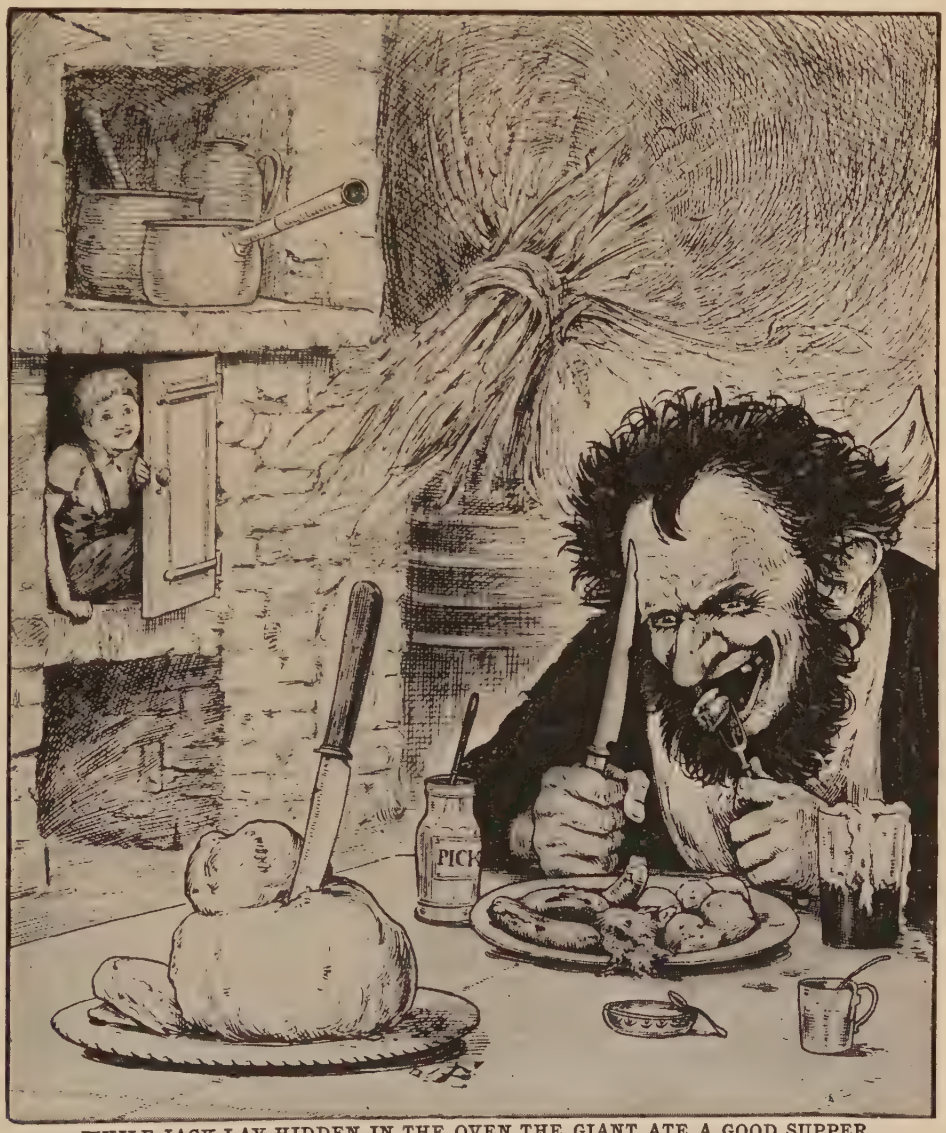
over the top of the boiler, that he determined to have it.

As soon as the ogre was safely asleep, Jack jumped up, seized the harp, and fled from the room. But the harp was a fairy harp, and it shrieked out: "Master! Master!"

The ogre started up and rushed after Jack, who was running away as fast as he could. He reached the bean-stalk, and began to climb down quickly. When he reached the ground, the ogre was nearly halfway down. Jack saw that there was not a moment to be lost. "Mother! Mother! Bring the hatchet. The ogre's coming down!" he shrieked.

Out rushed Jack's mother. Jack seized the hatchet, and with a single blow cut the bean-stalk right through. Down fell the ogre with a frightful crash, and so ended his wretched life.

Jack and his mother lived many happy years after this. When Jack grew to be a man, he fell in love with a beautiful princess and married her, for by that time he was rich and his adventures had made him famous, and they two lived happily forever afterward.



WHILE JACK LAY HIDDEN IN THE OVEN THE GIANT ATE A GOOD SUPPER

NUTCRACKER AND THE KING OF MICE

By Ernst Theodor Wilhelm Hoffmann

FRITZ and Marie had a lovely tree and presents from everybody at Christmas time. Their godpapa Drosselmeier gave them a wonderful mechanical toy—but what fascinated Marie most was a little man called Nutcracker, who could bite nuts and give you the kernels in less than no time. But Fritz gave him such hard nuts to crack that three teeth dropped out and his lower jaw was injured. We are going to read the story of what happened on the night after the Christmas tree.

As soon as Marie was alone, she set rapidly to work to do the thing which was chiefly at her heart to accomplish, and which, though she scarcely knew why, she somehow did not like to set about in her mother's presence. She had been holding Nutcracker, wrapped in the handkerchief, carefully in her arms all this time; and she now laid him softly down on the table, gently unrolled the handkerchief, and examined his wounds.

Nutcracker was very pale, but at the same time he was smiling with a melancholy and pathetic kindliness which went straight to Marie's heart.

"O my darling little Nutcracker!" said she very softly, "don't you be vexed because brother Fritz has hurt you so: he didn't mean it, you know; he's only a little bit hardened with his soldiering and that; but he's a good nice boy, I can assure you: and I'll take the greatest care of you and nurse you till you're quite, quite better and happy again. And your teeth shall be put in again for you, and your shoulder set right; godpapa Drosselmeier will see to that; he knows how to do things of the kind—"

Marie could not finish what she was going to say, because at the mention of godpapa Drosselmeier friend Nutcracker made a most horrible ugly face. A sort of green sparkle of much sharpness seemed to dart out of his eyes. This was only for an instant, however; and just as Marie was going to be terribly frightened, she found that she was looking at the very same nice, kindly face, with the pathetic smile, which she had seen before, and she saw plainly that it was nothing but some draught of air making the lamp flicker that had seemed to produce the change.

"Well!" she said, "I certainly am a silly girl to be so easily frightened, and think that a wooden doll could make faces at me! But I'm too fond really of Nutcracker, because he's so funny, and so kind and nice; and so he must be taken the greatest care of, and properly nursed till he's quite well."

With which she took him in her arms again, approached the cupboard, and kneeling down beside it, said to her new doll:

"I'm going to ask a favor of you, Miss Clara: that you will give up your bed to this poor, sick, wounded Nutcracker, and make yourself as comfortable as you can on the sofa here. Remember that you're quite well and strong yourself, or you wouldn't have such fat red cheeks, and that there are very few dolls indeed who have as comfortable a sofa as this to lie upon."

Miss Clara, in her Christmas full dress, looked very grand and disdainful, and said not so much as "Muck!"

"Very well," said Marie, "why should I make such a fuss, and stand on any ceremony?"—took the bed and moved it forward; laid Nutcracker carefully and tenderly down on it; wrapped another pretty ribbon, taken from her own dress, about his hurt shoulder, and drew the bedclothes up to his nose.

"But he shan't stay with that nasty Clara," she said, and moved the bed, with Nutcracker in it, up to the upper shelf, so that it was placed near the village in which Fritz's hussars had their cantonments. She closed the cupboard and was moving away to go to bed, when—listen, children!—there began a low soft rustling and rattling, and a sort of whispering noise, all round, in all directions, from all quarters of the room,—behind the stove, under the chairs, behind the cupboards. The clock on the wall "warned" louder and louder, but could not strike. Marie looked at it, and saw that the big gilt owl which was on the top of it had drooped its wings so that they covered the whole of the clock, and stretched its cat-like head, with the crooked beak, a long way forward. And the "warning"

kept growing louder and louder, with distinct words: "Clocks, clockies, stop ticking. No sound, but cautious 'warning.' Mousey king's ears are fine. Prr-prr. Only sing 'poom, poom'; sing the olden song of doom! prr-prr; poom, poom. Bells go chime! Soon rings out the fated time!" And then came "Poom! poom!" quite hoarsely and smothered, twelve times.

Marie grew terribly frightened, and was going to rush away as best she could, when she noticed that godpapa Drosselmeier was up on the top of the clock instead of the owl, with his yellow coat-tails hanging down on both sides like wings. But she manned herself, and called out in a loud voice of anguish:

"Godpapa! godpapa! what are you up there for? Come down to me, and don't frighten me so terribly, you naughty, naughty godpapa Drosselmeier!"

But then there began a sort of wild kickering and queaking, everywhere, all about, and presently there was a sound as of running and trotting, as of thousands of little feet behind the walls and thousands of little lights began to glitter out between the chinks of the woodwork. But they were not lights; no, no! little glittering eyes; and Marie became aware that everywhere mice were peeping and squeezing themselves out through every chink. Presently they were trotting and galloping in all directions over the room; orderly bodies, continually increasing, of mice, forming themselves into regular troops and squadrons, in good order, just as Fritz's soldiers did when manœuvres were going on. As Marie was not afraid of mice (as many children are), she could not help being amused by this; and her first alarm had nearly left her, when suddenly there came such a sharp and terrible piping noise that the blood ran cold in her veins. Ah! what did she see then? Well, truly, kind reader, I know that your heart is in the right place, just as much as my friend Field Marshal Fritz's is, itself: but if you had seen what now came before Marie's eyes, you would have made a clean pair of heels of it; nay, I consider that you would have plumped into your bed, and drawn the blankets further over your head than necessity demanded.

But poor Marie hadn't it in her power to do any such thing, because, right at her feet, as if impelled by some subterranean power, sand and lime and broken stone came bursting up, and then seven mouse-heads, with seven shining crowns upon them, rose through the floor, hissing and piping in a most horrible way. Quickly the body of the mouse which had those seven crowned heads forced its way up through the floor, and this enormous creature shouted, with its seven heads, aloud to the assembled multitude, squeaking to them with all the seven mouths in full chorus; and then the entire army set itself in motion, and went trot, trot, right up to the cupboard—and in fact, to Marie who was standing beside it.

Marie's heart had been beating so with terror that she had thought it must jump out of her breast, and she must die. But now it seemed to her as if the blood in her veins stood still. Half fainting, she leant backwards, and then there was a "klirr, klirr, prr," and the pane of the cupboard, which she had broken with her elbow, fell in shivers to the floor. She felt for a moment a sharp, stinging pain in her arm, but still this seemed to make her heart lighter; she heard no more of the queaking and piping. Everything was quiet; and though she didn't dare to look, she thought the noise of the glass breaking had frightened the mice back to their holes.

But what came to pass then? Right behind Marie a movement seemed to commence in the cupboard, and small faint voices began to be heard, saying:

"Come, awake, measures take;
Out to the fight, out to the fight;
Shield the right, shield the right;
Arm and away,—this is the night."

And harmonica bells began ringing as prettily as you please.

"Oh! that's my little peal of bells!" cried Marie, and went nearer and looked in. Then she saw that there was bright light in the cupboard, and everything busily in motion there; dolls and little figures of various kinds all running about together, and struggling with their little arms. At this point, Nutcracker rose from his bed, cast off the bedclothes, and sprung with both feet on to the floor (of the shelf), crying out at the top of his voice:

"Knack, knack, knack,
Stupid mousey pack,
All their skulls we'll crack.

Mousey pack, knack, knack,
Mousey pack, crick and crack,
Cowardly lot of schnack!"

And with this he drew his little sword, waved it in the air, and cried: "Ye, my trusty vassals, brethren and friends, are ye ready to stand by me in this great battle?"

Immediately three scaramouches, one pantaloon, four chimney-sweeps, two zither-players and a drummer, cried in eager accents: "Yes, your Highness: we will stand by you in loyal duty; we will follow you to the death, the victory, and the fray!" And they precipitated themselves after Nutcracker (who in the excitement of the moment had dared that perilous leap) to the bottom shelf. Now *they* might well dare this perilous leap; for not only had they got plenty of clothes on, of cloth and silk, but besides, there was not much in their insides except cotton and sawdust, so that they plumped down like little woodsacks. But as for poor Nutcracker, he would certainly have broken his arms and legs; for, bethink you, it was nearly two feet from where he had stood to the shelf below, and his body was as fragile as if he had been made of elm-wood. Yes, Nutcracker would have broken his arms and legs had not Miss Clara started up from her sofa at the moment of his spring, and received the hero, drawn sword and all, in her tender arms.

"O you dear good Clara!" cried Marie, "how I did misunderstand you! I believe you were quite willing to let dear Nutcracker have your bed."

But Miss Clara now cried, as she pressed the young hero gently to her silken breast: "O my lord! go not into this battle and danger, sick and wounded as you are. See how your trusty vassals —clowns and pantaloon, chimney-sweeps, zithermen, and drummer—are already arrayed below; and the puzzle figures, in my shelf here, are in motion and preparing for the fray! Deign, then, O my lord, to rest in these arms of mine, and contemplate your victory from a safe coign of vantage."

Thus spoke Clara. But Nutcracker behaved so impatiently, and kicked so with his legs, that Clara was obliged to put him down on the shelf in a hurry. However, he at once sank gracefully on one knee, and expressed himself as follows: "O lady! the kind protection and aid which you have afforded me will ever be present to my heart, in battle and in victory!"

On this, Clara bowed herself so as to be able to take hold of him by his arms, raised him gently up, quickly loosed her girdle, which was ornamented with many spangles, and would have placed it about his shoulders. But the little man drew himself swiftly two steps back, laid his hand upon his heart, and said with much solemnity: "O lady! do not bestow this mark of your favor upon me; for—" He hesitated, gave a deep sigh, took the ribbon with which Marie had bound him from his shoulders, pressed it to his lips, put it on as a cognizance for the fight, and waving his glittering sword, sprang like a bird over the ledge of the cupboard down to the floor.

You will observe, kind reader, that Nutcracker, even before he really came to life, had felt and understood all Marie's goodness and regard, and that it was because of his gratitude and devotion to her that he would not take, or wear even, a ribbon of Miss Clara's, although it was exceedingly pretty and charming. This good, true-hearted Nutcracker preferred Marie's much commoner and more unpretending token.

But what is going to happen further, now? At the moment when Nutcracker sprang down, the queaking and piping commenced again worse than ever. Alas! under the big table the hordes of the mouse army had taken up a position, densely massed, under the command of the terrible mouse with the seven heads. So what is to be the result?

The Battle

"Beat the *Générale,* trusty vassal drummer!" cried Nutcracker very loud; and immediately the drummer began to roll his drum in the most splendid style, so that the windows of the glass cupboard rattled and resounded. Then there began a cracking and a clattering inside, and Marie saw all the lids of the boxes in which Fritz's army was quartered bursting open, and the soldiers all came out and jumped down to the bottom shelf, where they formed up in good order. Nutcracker hurried up and down the ranks, speaking words of encouragement.

"There's not a dog of a trumpeter taking the trouble to sound a call!" he

cried in a fury. Then he turned to the pantaloon (who was looking decidedly pale), and wobbling his long chin a good deal, said in a tone of solemnity: "I know how brave and experienced you are, General! What is essential here is a rapid comprehension of the situation, and immediate utilization of the passing moment. I intrust you with the command of the cavalry and artillery. You can do without a horse; your own legs are long, and you can gallop on them as fast as is necessary. Do your duty!"

Immediately Pantaloon put his long lean fingers to his mouth, and gave such a piercing crow that it rang as if a hundred little trumpets had been sounding lustily. Then there began a tramping and a neighing in the cupboard; and Fritz's dragoons and cuirassiers—but above all, the new glittering hussars—marched out, and then came to a halt, drawn up on the floor. They then marched past Nutcracker by regiments, with *guidons* flying and bands playing; after which they wheeled into line, and formed up at right angles to the line of march. Upon this, Fritz's artillery came rattling up, and formed action-front in advance of the halted cavalry. Then it went "boom-boom!" and Marie saw the sugar-plums doing terrible execution amongst the thickly massed mouse battalions, which were powdered quite white by them, and greatly put to shame. But a battery of heavy guns, which had taken up a strong position on mamma's footstool, was what did the greatest execution; and "poom-poom-poom!" kept up a murderous fire of gingerbread nuts into the enemy's ranks with most destructive effect, mowing the mice down in great numbers. The enemy, however, was not materially checked in his advance, and had even possessed himself of one or two of the heavy guns, where there came "prr-prr-prr!" and Marie could scarcely see what was happening, for smoke and dust; but this much is certain, that every corps engaged fought with the utmost bravery and determination, and it was for a long time doubtful which side would gain the day. The mice kept on developing fresh bodies of their forces, as they were advanced to the scene of action; their little silver balls—like pills in size—which they delivered with great precision (their musketry practice being specially fine) took effect even inside the glass cupboard. Clara and Gertrude ran up and down in utter despair, wringing their hands and loudly lamenting.

"Must I—the very loveliest doll in all the world—perish miserably in the very flower of my youth?" cried Miss Clara.

"Oh! was it for this," wept Gertrude, "that I have taken such pains to *conserver* myself all these years? Must I be shot here in my own drawing-room after all?"

On this they fell into each other's arms, and howled so terribly that you could hear them above all the din of the battle. For you have no idea of the hurly-burly that went on now, dear auditor! It went prr-prr-poof, piff-schnetterdeng-schnetterdeng-boom-booroom-boom-booroom-boom—all confusedly and higgledy-piggledy; and the mouse king and the mice squeaked and screamed; and then again Nutcracker's powerful voice was heard shouting words of command and issuing important orders, and he was seen striding along amongst his battalions in the thick of the fire.

Pantaloon had made several most brilliant cavalry charges, and covered himself with glory. But Fritz's hussars were subjected—by the mice—to a heavy fire of very evil-smelling shot, which made horrid spots on their red tunics: this caused them to hesitate, and hang rather back for a time. Pantaloon made them take ground to the left, in *échelon;* and in the excitement of the moment, he, with his dragoons and cuirassiers, executed a somewhat analogous movement. That is to say, they brought up the right shoulder, wheeled to the left, and marched home to their quarters. This had the effect of bringing the battery of artillery on the footstool into imminent danger; and it was not long before a large body of exceedingly ugly mice delivered such a vigorous assault on this position that the whole of the footstool, with the guns and gunners, fell into the enemy's hands. Nutcracker seemed much disconcerted, and ordered his right wing to commence a retrograde movement. A soldier of your experience, my dear Fritz, knows well that such a movement is almost tantamount to a regular retreat, and you grieve with me, in anticipation, for the disaster which threatens the army of Marie's beloved little Nutcracker. But turn your glance in the other direction, and look at this

left wing of Nutcracker's, where all is still going well, and you will see that there is yet much hope for the commander-in-chief and his cause.

During the hottest part of the engagement, masses of mouse cavalry had been quietly debouching from under the chest of drawers, and had subsequently made a most determined advance under the left wing of Nutcracker's force, uttering loud and horrible queakings. But what a reception they met with! Very slowly, as the nature of the *terrain* necessitated (for the ledge at the bottom of the cupboard had to be passed), the regiment of motto figures, commanded by two Chinese emperors, advanced and formed a square. These fine, brilliantly uniformed troops, consisting of gardeners, Tyrolese, Tungooses, hair-dressers, harlequins, Cupids, lions, tigers, unicorns and monkeys, fought with the utmost courage, coolness and steady endurance. This *bataillon d'élite* would have wrested the victory from the enemy had not one of his cavalry captains, pushing forward in a rash and foolhardy manner, made a charge upon one of the Chinese emperors and bitten off his head. This Chinese emperor, in his fall, knocked over and smothered a couple of Tungooses and a unicorn; and this created a gap, through which the enemy effected a rush which resulted in the whole battalion being bitten to death. But the enemy gained little advantage by this; for as soon as one of the mouse cavalry soldiers bit one of these brave adversaries to death, he found that there was a small piece of printed paper sticking in his throat, of which he died in a moment. Still, this was of small advantage to Nutcracker's army, which, having once commenced a retrograde movement, went on retreating farther and farther, suffering greater and greater loss. So that the unfortunate Nutcracker found himself driven back close to the front of the cupboard, with a very small remnant of his army.

"Bring up the reserves! Pantaloon! Scaramouche! Drummer! where the devil have you got to?" shouted Nutcracker, who was still reckoning on reinforcements from the cupboard. And there did, in fact, advance a small contingent of brown gingerbread men and women, with gilt faces, hats, and helmets; but they laid about them so clumsily that they never hit any of the enemy, and soon knocked off the cap of their commander-in-chief, Nutcracker himself. And the enemy's chasseurs soon bit their legs off, so that they tumbled topsy-turvy, and killed several of Nutcracker's companions-in-arms into the bargain.

Nutcracker was now hard pressed, and closely hemmed in by the enemy, and in a position of extreme peril. He tried to jump to the bottom ledge of the cupboard, but his legs were not long enough. Clara and Gertrude had fainted; so they could give him no assistance. Hussars and heavy dragoons came charging up at him, and he shouted in wild despair: "A horse! a horse! My kingdom for a horse!"

At this moment two of the enemy's riflemen seized him by his wooden cloak, and the king of the mice went rushing up to him, squeaking in triumph out of all his seven throats.

Marie could contain herself no longer. "O my poor Nutcracker!" she sobbed; took off her left shoe without very distinctly knowing what she was about, and threw it as hard as she could into the thick of the enemy, straight at their king.

Instantly everything vanished and disappeared. All was silence. Nothing to be seen. But Marie felt a more stinging pain than before in her left arm, and fell on the floor insensible.

When Marie came to she was in bed, with Mother and the doctor bending over her. Mother scolded her gently for having gone to sleep playing with her toys, and so to have fallen against the glass cupboard and cut her arm badly.

THE NEXT STORIES ARE ON PAGE 3711.

Ben Jonson.

James Hogg.

Lady Naime.

Andrew Cherry.

Charles Dibdin.

Charles Mackay.

Thomas Campbell.

James Thomson.

Thomas H. Bayly.

David Garrick.

Edward Fitzball.

Henry Russell.

WRITERS OF FAMOUS SONGS

CONTINUED FROM 3496

Thomas Moore.

A FAMOUS man once said that he would rather make the songs of a country than make its laws. He meant that songs had such a hold on the people that, if they were good songs, they were better worth considering as a moral power than the laws which are made for us by legislatures. That was going just a little too far, but there is a great deal of truth in the saying. Songs really do have a great influence. Many of us know Home, Sweet Home, or The Last Rose of Summer, or Auld Lang Syne, or perhaps a dozen other songs, before we know much about the laws of our country. And we get not only ideas and principles from songs, but even powerful persuasions to action.

We are going to learn something about our most popular songs and the men and women who wrote them. Perhaps the most popular writer of songs was Robert Burns, but we have told about him on page 2135. So we shall give first place to the writer of a single song, Rouget de Lisle, who produced the French Marseillaise. In his story of the French Revolution Carlyle says of this song: "The sound of it will make the blood tingle in men's veins; and whole armies and assemblages will sing it with eyes weeping and burning, with hearts defiant of Death, Despot, and Devil." One republican general declared that it was worth an addition of a thousand men to his ranks; and a great German poet said that it had caused the death of fifty thousand of his countrymen. Its stirring strains and martial music have the power to fill with enthusiasm even people who are not French. It is small wonder, then, that the song electrifies French people. It expresses all their intense love of freedom, and inspires them to dare and do great things for France.

The author of this grand martial song, Rouget de Lisle, was a captain of engineers stationed at Strassburg just before the French Revolution broke out in all its fury. He was an all-round man: poet, dramatist, violinist and singer; and he wrote the song in a mood of excitement and inspiration one night in April, 1792. To its strains the soldiers from Marseilles entered Paris and marched to the attack on the Tuileries.

It was because of this connection with Marseilles that the song was called the Marseillaise. It is a strange

fact that though this song became the marching hymn of the Revolutionists, De Lisle himself was a Royalist, and was condemned to death. He escaped death, however, and got a pension from Louis XVIII on account of the song; and we can see a monument erected to his memory in the town of Choisy-le-Roi, where he died in 1836.

A STIRRING NATIONAL SONG WRITTEN BY THE POET OF NATURE

There is nothing resembling the Marseillaise among songs in English. God Save the King, about the origin and authorship of which nobody is really certain, is almost tame by comparison with the fiery French strain. But there is Rule, Britannia, a grand song which Southey, the poet, said would be the battle hymn of England so long as England maintained her political power. It is a pity we should not be able to say with absolute certainty who is the author of this stirring piece. The difficulty arises in this way: Rule, Britannia! appeared first in a play called Alfred, written in 1740, to commemorate the accession of George I. The authors of the play were James Thomson, the author of The Seasons, and David Mallet. Unfortunately they did not show just which parts of the play each had written. The music was written by Thomas Arne.

Thomson died in 1748, before Rule, Britannia! became very popular; so he had no special reason for claiming it for himself, if it was his. But experts who have looked into the matter generally give him the honor, and we may safely follow them. "Jemmy" Thomson, as they familiarly called him, was not a great poet, but lovers of nature still like to read his book The Seasons. He took life so easily—so indolently, we should say—that he could often be seen standing in his garden at Richmond, Surrey, eating the peaches off the trees, with his hands in his pockets.

A SCOTTISH POET AND HIS FAMOUS SONGS OF NELSON AND THE SEA

After him we may mention another Scot, Thomas Campbell, considered a great poet in his day. He was a Glasgow man, born in 1777, and he wrote his once-popular Pleasures of Hope when he was only twenty-one. His reputation is not nearly so great as it was, but his war songs, such as Hohenlinden, and the magnificent Battle of the Baltic, describing incidents connected with Nelson's historic fight at Copenhagen in 1801 have not been forgotten. It was Campbell, too, who sang of The Exile of Erin and who made Ye Mariners of England immortal. The last-named was written in imitation of an old seventeenth-century song bearing the same name, which Campbell used to sing at musical parties in Edinburgh. It is perhaps his best.

While we are thinking of this song let us think of some more sea songs known to us. The man who wrote the greatest number of sea songs was Charles Dibdin. Everybody has heard his Tom Bowling, and if we don't often hear his Poor Jack, or I Sailed from the Downs in the Nancy, or 'Twas in the Good Ship Rover, and other old-time favorites from his pen, we are probably hearing much less entertaining and breezy things.

A WRITER OF SEA SONGS WHO KNEW LITTLE OF SAILORS OR THE SEA

Dibdin had very little personal acquaintance with either sailors or the sea, but up to his time the British tar had not received much attention in song, and as Dibdin had a great liking for the plain, manly character of the British tar, he resolved to make verses about him. His songs had a really practical effect, for they inspired thousands of England's sailors, besides warming their hearts in hours of merriment and lightening their dreary hours when they were prisoners in the hands of the enemy. Poor Dibdin had rather a hard life, but the Government, in his later days, gave him a pension for his sea songs. He died in 1814, at the age of sixty-nine, and was buried in Camden Town.

Of course there were other writers of sea songs besides Dibdin. We think of David Garrick chiefly as a great actor, but it was David Garrick who wrote the patriotic song Hearts of Oak. He wrote it under the inspiration of that wonderful year 1759, of which it makes mention—the year of Quiberon and Quebec and Minden, when the British arms were covered with glory by Lord Hawke and General Wolfe and the Marquis of Granby.

We know very little about the man who gave us that familiar song Ben Bolt. His name was Thomas Dunn English. He was an American, a lifelong friend of Edgar Allan Poe, the author of The Raven, and he died as recently as 1902.

PICTURE-STORIES OF TWO FAMOUS SONGS

All know the story of The Mistletoe Bough. The bride of Lord Lovel, on her wedding night, hid for fun in a large chest, but the lid closed down and the spring lock fastened her in. Years later her skeleton was found in the chest. This story was made into a song by Thomas Haynes Bayly.

Another sad song is Auld Robin Gray, written by Lady Anne Lindsay to raise money for an old nurse. The title of the song was the name of a real person, a shepherd, who, when Lady Anne with her brother and sister ran away from home, took them back to their mother.

Then we ought to mention Andrew Cherry, who wrote The Bay of Biscay, and also the best song that we have about the "dear little Shamrock of Ireland." Cherry was the son of a Limerick bookseller. He took to the stage and appeared at Drury Lane Theatre in 1802. He died ten years later. Nor must we forget Samuel J. Arnold, who wrote The Death of Nelson. Arnold was very fond of sea subjects, and wrote another once-popular song, Speed on, My Bark, Speed on. He was a son of Dr. Arnold, a famous English composer.

A SONG SUNG AGAIN AND AGAIN, TILL THE SINGER COULD SING NO MORE

The Death of Nelson appeared in an opera produced in London not very long after the great admiral's death. Braham, the great tenor, who once sold pencils in the street, had written the music, and it was he who sang it first. The enthusiasm was tremendous. Nelson had been the nation's hero, and this song about him had to be repeated again and again, until Braham was in a state of collapse.

Among the sea songs we must not forget Rocked in the Cradle of the Deep. It was written by Emma Willard, an American teacher. The song would probably not have been so well known had not a clergyman, Joseph Knight, made for it the fine tune that we know so well.

But we must think of the soldiers as well as of the sailors. To be sure, there are not so many songs about soldiers as about sailors, perhaps because there is less romance about life on land than about life at sea. But there is The British Grenadiers, a song about which we know nothing more than this, that the words date from 1690 and that the tune comes down from the sixteenth century. And then we have the favorite, The Girl I Left behind Me, which may be regarded as the property of both soldiers and sailors. It has been played for a century or more when a man-of-war weighs anchor and when a regiment quits the town in which it has been quartered. Consequently it is known wherever English-speaking soldiers and sailors go.

SONGS THAT ARE SUNG WHEN THE NATION IS REJOICING

Your parents remember the rejoicings that took place over the capture of the German lines in Belgium. Well, in the days of the Crimea the English had similar cause for rejoicing, as it was then that they sang: Cheer, Boys, Cheer, Sebastopol is Taken. That was one of the most popular songs of the day. It was written by Charles Mackay, a Scotsman. In war-time no song has ever been so popular as It's a Long Way to Tipperary, which was sung so much during the World War.

Henry Russell was a popular song and story entertainer for many years, and he wrote many songs, both words and music, of his own. Many of us know his A Life on the Ocean Wave, and his setting of Dickens' pretty verses about The Ivy Green. He was a very realistic singer and moved his audiences strongly. Once he sang a song which he had written about a Newfoundland dog that had bravely leaped overboard from a vessel and saved a drowning child. At the end of the song a man in the gallery called out: "Mr. Russell, if that dog is yours, I'll give you a sovereign for a pup."

Russell had been fondled on the knees of George IV early in the last century, but he lived until the year 1900. It is his son, Clark Russell, who has given us so many interesting and stirring sea stories.

SAD SONGS THAT OUR GRANDMOTHERS USED TO SING

Then there was Thomas Haynes Bayly. We do not know his songs so well as our grandfathers and grandmothers used to know them; but we know at least The Mistletoe Bough, and we have heard of She Wore a Wreath of Roses; Oh, no! We Never Mention Her; I'll Hang My Harp on a Willow Tree; and Gaily the Troubadour Touched His Guitar.

Bayly was born in the old town of Bath in 1797, and died in 1839, after years of misfortune. His father was a lawyer. He wanted his son to become a lawyer also, but the youth took a great dislike to the law. The father then tried him with the Church, but he did not like that either; so at last he joined the ranks of those who looked to literature for a living. There is a fine old flavor about his songs, something like what we should experience, perhaps, if we opened an old bureau and turned over the letters of our grandmothers. Andrew Lang says it is "like listening, in the sad, yellow evening, to the strains of a barrel-organ, faint and sweet, and far away." And so it is. Bayly could play beautifully with old

romance, and in that direction song has nothing more effective to show us than The Mistletoe Bough. When the bride got into the ancient chest,

"It closed with a spring. And, dreadful doom!
The bride lay clasped in her living tomb";

so that her lover "mourned for his fairy bride," and never discovered the whereabouts of her premature tomb.

Some famous songs that were written about real people

It is said that such an incident once really happened. And that may serve to remind us that famous songs have often been made about real people. There is Annie Laurie, for instance. Few of us probably think of Annie Laurie as having existed in real life, but she did. If we go to Dumfries to-day we may see her last will and testament in one of the institutions there. We know that the song begins "Maxwelton braes are bonnie," and Maxwelton is near Dumfries. Annie Laurie was born at Maxwelton in December, 1682; and to-day she lies at rest in Dunscore churchyard, about which Carlyle often speaks in his letters, for he, too, belonged to that district.

Annie Laurie had a sweetheart—a Mr. Douglas—and it was he who made the original of the song about her. But his lines were not very refined, and so they were recast by Lady John Scott. She had no idea that her version of the old song would become popular, but she printed it for a bazaar held in behalf of the widows and orphans of soldiers who had been killed in the Crimea, and it was soon taken up and sung everywhere.

A famous song that was written by a farmer's son in ten minutes

Then there is My Pretty Jane, a song which a great tenor, Mr. Sims Reeves, made immortal by his splendid rendering of it. This song was written by Edward Fitzball, a farmer's son, who used to wander about the lanes of Burwell, a little village about eleven miles from Cambridge. Near one of these lanes "a farmer did dwell," as the song says. He had a daughter, and she was the "pretty Jane." Jane had a bewitching manner, and Fitzball fell in love with her.

One morning he sat down in his father's fields, when the bloom was on the rye, and wrote this song in ten minutes. Later he gave the words to Sir Henry Bishop, the man who composed the tune for Home, Sweet Home, and Bishop produced the melody which has literally gone round the world. It is sad to have to add that this same "pretty Jane" died of tuberculosis in the height of her youth and beauty.

The Lass of Richmond Hill, too, was a real heroine. Some tell us that she belonged to the Richmond in Surrey, perhaps because there is, or was, an inn there called The Lass of Richmond Hill. But she was the daughter of a King's Bench solicitor who had a place called "Hill House," in Richmond, Yorkshire. Her name was Frances I'Anson. She married Leonard MacNally, an Irish barrister, and it was he who wrote the song about her which has become so popular.

The alley poet, whose song was sung in royal palaces

Still another real heroine was Henry Carey's Sally in our Alley. Sally was, in fact, a London girl who had gone out one holiday with her sweetheart. Carey happened to notice the pair, and the song was the result of his study of them. All London roared at the idea of making a song on such a subject, and they made Carey very unhappy by calling him the "alley poet." But his song became very popular, and he lived to hear it sung everywhere. Ben Jonson's beautiful song, Drink to Me Only with Thine Eyes, is sung everywhere, but no one knows the author of the tune.

So far we have not noticed any of the women song-writers. When we come to think of them, it is curious to reflect that many of them were Scottish women; still more curious to note that two of them, at least, wanted to hide what they had done. There was first Lady Anne Lindsay, who wrote the fine ballad of Auld Robin Gray, for which Mr. Reeves, a Somerset clergyman, made such an exquisite tune. She was one of a family who had long been known for their literary and artistic gifts. Her father was the Earl of Balcarres, and she was born in 1750. Her mother, who was very severe, used to shut her children in dark closets or give them only bread and water when they did anything wrong.

One day the young people decided to rebel and run away. They did run away, but the old shepherd of the place stopped them and brought them back to be

punished. The shepherd's name was Robin Gray, and it was the memory of this incident in her young days that made Lady Anne take his name for her song, when she came to write it many years later.

How people tried to discover the author of a very popular song

The song soon became popular, but she had not put her name to it, and people began to ask about the authorship. Indeed, a learned Edinburgh society offered a hundred dollars for the name of the writer. This strikes us as very curious nowadays, when we find everybody rather proud of being able to write. But we must remember that people were not so proud of writing a hundred years ago. We all know how Scott wrote the Waverley novels secretly. People thought it undignified to write for print. Lady Lindsay said that she had a dread of writing anything "because of the shyness it created in those who could write nothing." In other words, she did not want to make people who could not write uncomfortable in her presence.

Another great woman writer of Scottish songs held the same view. This was Lady Nairne, the author of The Land o' the Leal, and Caller Herrin', and a goodly number of songs about Bonnie Prince Charlie and the fight he made in 1745-46 for the crown of his fathers. Lady Nairne sent her songs to the publisher under the name of "Mrs. Bogan," and when she went to see him at his office she went disguised.

A song that brought comfort to a sorrowing mother

She is best known now by The Land o' the Leal, which was written to console a friend who had lost her first-born child. That is the meaning of the line, "Oor bonnie bairn's there, Jean"; for the "land o' the leal" means heaven, and not, as some people think, the country north of the Tweed. Lady Nairne belonged to an old family who had fought and bled for the Stuarts, so it was no wonder that she made so many fine songs about the Jacobites and about the cause which ended so disastrously at Culloden.

But there were other writers of songs about Prince Charlie besides Lady Nairne. There was James Hogg, for instance, better known as the "Ettrick Shepherd"—one of the most wonderful natural geniuses that Scotland ever produced. He got little more than six months' schooling, and he was a man before he could write down the letters of the alphabet correctly; yet he gave us such songs as Bonnie Prince Charlie; Flora Macdonald's Lament; Come o'er the Stream, Charlie; and When the Kye Comes Hame. He was a real shepherd, and lived all his days near that Yarrow of which Wordsworth has written so tenderly. William Glen, a Glasgow merchant, should be mentioned for his Wae's Me for Prince Charlie, a song for which the late Queen Victoria often asked when anybody was singing in her presence. You may read more about Prince Charlie on page 5639. Of course the most popular Scottish song is Auld Lang Syne. In this Burns simply modernized a song centuries old.

The famous poet of Ireland and the beautiful songs he wrote

Of writers of Irish songs which have become famous, quite a number might be mentioned. Perhaps there is nothing more popular than Tom Moore's Last Rose of Summer, though Robin Adair, the writer of which we do not know, is a pretty close second. Moore was a perfect master of song-writing, and his Irish Melodies included many songs that were once very popular. Some, indeed, such as The Minstrel Boy to the War Has Gone, and The Harp That Once thro' Tara's Halls, are still widely known, and are often heard upon the concert platform. Moore is, without question, one of the greatest English-speaking song-writers. His sentiments are so beautifully expressed that they appeal not only to the Irish nation, but to the whole Anglo-Saxon race. We are glad to say that he got both fame and money from his songs.

It was Samuel Lover, the novelist, who gave us Rory O'More, which became so popular that it was played by most bands when Queen Victoria was crowned. The Wearin' o' the Green is always in great request at Irish patriotic gatherings. There are many versions. The favorite one is that written by Boucicault, the actor. The name of the author of The Cruiskeen Lawn, another popular Irish song which Boucicault introduced into The Colleen Bawn, is lost to us forever.

We know all about Kathleen Mavourneen, the beautiful song which was writ-

ten by an Irish lady, Mrs. Crawford, and set to music by Mr. F. N. Crouch, who had sung as a choir-boy in Westminster Abbey. Crouch got just $25 for his music—the same as Milton got for Paradise Lost—but when the copyright was sold some years ago it realized the substantial sum of $3,000.

It was the music of Michael William Balfe that made the song of Killarney, written by Mr. E. Falconer, known in all English-speaking lands. If Balfe had written nothing but this song and the opera of The Bohemian Girl his name would have been handed down to posterity.

Henry Carey, at one time thought to be the author and composer of God Save the King, is best known by his popular song Sally in our Alley. Carey wrote this song after seeing a London girl of the poorer class out for a holiday with her sweetheart, a scene pictured here by the artist.

To Sir Walter Scott, about whom we can read on page 2625, the world owes not only the noted Waverley novels and narrative long poems, but a number of songs which still stir the heart. Bonnie Dundee; March, March, Ettrick and Teviotdale; and Pibroch of Donuil Dhu are martial songs which everyone knows. But Jock o' Hazeldean, that lilting love song, and O Hush Thee, My Baby, a cradle song, are equally dear to people to-day.

There are many more songs that can be mentioned only briefly, such, for example, as the famous Cherry Ripe, the words of which were written by Robert Herrick, and The Vicar of Bray. Sir Arthur Sullivan wrote the music for The Lost Chord while sitting beside the bed of his dying brother. The words are by Adelaide Procter. It is difficult to close without mentioning a dozen others. Some of them are given in the Book of Poetry. If the number of years which a song has lived on people's lips gives it and its writer the right to be called famous we should make special mention here of Quintus Horatius Flaccus and his Integer Vitæ. Every college student knows that song which Horace wrote nearly two thousand years ago in far-off Italy. It was Horace who wrote: "I have erected a monument more lasting than brass and loftier than the regal structure of the pyramids." Horace meant that his writings would keep his name alive. And as long as college students sing Integer Vitæ, Horace deserves to be called a great song-writer. On page 5911 you can read more about this remarkable man.

In the article on American songs you may learn all about Home, Sweet Home; Yankee Doodle; Dixie; The Star-Spangled Banner; John Brown's Body; When

Johnny Comes Marching Home, and many another lyric, the lilting melodies of which are known wherever English is spoken.

We mentioned one French song in the beginning of this story. There are others hardly less famous, and other countries also have their famous songs. We shall now take a little space to tell you of some of them.

The stirring March of the Men of Harlech, the Welsh national song, was written some centuries ago, but no one knows who the writer was. The same thing is true of the famous Danish national song King Christian Stood Beside the Mast. It was written in the seventeenth century and commemorates a battle between Christian IV and the Swedes in 1644. It was this same Christian who went to the aid of Bohemia at the beginning of the Thirty Years' War.

The Watch on the Rhine, one of the best known of the German national songs, was written by Max Schenckenburger, a young merchant who lived in the town of Thalheim, in Württemberg. It is not known that he wrote anything else, but this one song has had a tremendous influence on the German people. In 1870, when the king of Prussia was going to war with France, the Watch on the Rhine was chosen as a marching song for the army. It at once became popular, and by common consent was made the national song for the new empire. Its writer had died some years before this, and few people stop to inquire his name.

Adelaide, a very famous song which was set to music by Beethoven, has a history which is almost as romantic as the story of Annie Laurie. It was written by a poet named Friedrich Matthisson, the son of a poor clergyman. In his youth the poet was a reader in the household of a German princess who had a beautiful maid of honor named Annette von Glafey. Maid and poet loved each other, but, alas, the maid's father forbade their marriage, saying that his daughter must choose between marrying a husband of her own rank and becoming a nun. Refusing to marry a man whom she did not love, Annette chose the convent. She entered the abbey of Mosigkan, of which in time she became abbess. She lived to be a very old woman. The poet, who married another lady, also lived to a good old age.

"Il pleut, bergère, il pleut, bergère" (The rain is falling, shepherd maid) is a tender little French song which is familiar to all children, and to the grown-up people of France, too. It was written in the eighteenth century by a poet named Philippe François Fabre, who signed himself Fabre d'Eglantine. In the time of the Revolution, Fabre became secretary to Danton, one of the Revolutionary leaders. When Danton fell from power Fabre fell with him and met his death on the guillotine. Of all that he wrote, this pretty song is the only thing that is remembered.

Fabre's birthplace, Carcassonne, is famous for its wonderful medieval fortress; but to the minds of many people it is more famous for a ballad written by Gustave Nadaud. Of course a ballad can scarcely be called a song, but Nadaud wrote many songs, which are, however, not well known by English-speaking people. He lived in Roubaix, a noisy manufacturing town in the north of France, and it is possible that he never saw the town whose name his musical verses have made familiar to many.

No one knows who wrote the famous old French song "Marlbrough s'en va-t-en-guerre," which may still be heard among the French Canadian habitants. Some people say it was written about the great Duke of Marlborough; others say it was written long before his time. At any rate, it was sung by his nurse to the baby son of Louis XVI and Marie Antoinette. Marie Antoinette learned it; pretty soon the whole court was singing it. It was taken up by the Revolutionists. Napoleon sang it; and its echoes have come to us in the rousing chorus We Won't Go Home until Morning.

A young French poet named Jenneval wrote La Brabançonne, or the song of Brabant, the national song of Belgium, each stanza of which ends with the words "For King, for Law, for Liberty." The poet joined the Belgians in 1830 in their fight for independence, and fell in battle.

Nearly all the nations of to-day have national songs, into the singing of which the people put all the passionate love of country which is implanted in the heart of every true man and woman. You will find the words of these national anthems in the Book of Poetry, where you can also read of the lives of the authors.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 3845.

The Kakapo, or Owl-parrot.

THE PARROTS AND THE OWLS

CONTINUED FROM 3502

TO most of us there would seem little in common between the gay parrot and that grim creature of the night, the stealthy, soft-flighted owl. One is the joyous chatterbox in a host of homes all over the world; the other, from ancient days to modern, has been the centre of sinister legend and tradition. The grouping of the animal family brings relationships to light which are startling in their unexpectedness. The parrot claims cousinship both with the cuckoo of the day and with the bird of night.

The one amuses us; the other labors in our interests, if at the cost of something of our cheerfulness. Let us welcome the parrot for his chuckling jollity, the owl as a scourge of our enemies. A study of their ways will increase our respect for both, and not wholly dispel a slight thrill of awe.

Who could better introduce the impertinent Parrot Family than that parrot which, escaping from its home, flew into the convalescent ward of a hospital one summer afternoon, hung himself upside down from the ceiling, surveyed the inmates in their beds, and greeted them with a cheerful "Hello"?

That is the sort of thing parrots do. They astonish us at times with borrowed speech which suggests intelligence. But a parrot will laugh and whistle at a funeral as readily as it will say melancholy things at a wedding; it has no sense of fitness in its accidental speeches. The words it utters have no more meaning for it than its mimicry of saws and steam whistles, and it is just as likely to pour forth one as the other.

We are bound to look at this side of Polly's place in the world. As a talker and echo of sounds it has made its fame and fortune in civilization. The gift of reproducing speech and a multitude of sounds is not restricted to parrots, but the parrot uses the gift most cleverly. In freedom the parrot has no apparent need of such a faculty. There is a definite parrot language—shrieks, squawks, occasional warblings, and sounds as of tearing calico. That serves the parrot all the purposes of communication in the wilds, and the vivid colors of the birds, nearly all tree-dwellers, are beacons which no keen bird eye can miss.

With this wasted gift of mimicry are associated the use of the foot as a hand, and structural features which claim attention. Essentially a climber, the parrot has feet in which one toe is always turned backward and can be joined by a second toe. That is to say, standing on the ground, the bird

has three toes pointing forward and one back; but when gripping a branch it has two toes forward and as many in the reverse position.

THE STRENGTH AND USEFULNESS OF THE PARROT'S BEAK

The beak, which is used to haul the bird about, is an implement of greater power than we suspect. The upper half can be raised like the lid of a box, and so we should not expect it to be richly endowed with strength; but there are nut-eating parrots whose power is so astounding that they can crack Brazil nuts. Birds in captivity have been seen to bend stout brass knobs with their beaks. Such strength is unique among birds. Falcons and owls tear things like miniature tigers, but some parrots have a force which may be compared with the bone-smashing jaws of the hyena.

The number of species in the Order is enormous. Some ornithologists count over six hundred. Most of them belong to the tropics, and few enter the temperate zones. South America has over a hundred and fifty species, but only one is found in North America.

The birds which occur first in the Order leave a painful impression on the minds of those who wish to think well of parrots. They are the Nestors, the unique group of New Zealand and its islands. There were four species within historical times, but the number is now reduced to two, the Kea and the Kaka.

THE TERRIBLE WAR OF THE KEA AGAINST THE SHEEP

Both are long-beaked and have fringed tongues, showing that Nature brought them up to make nectar and fruit juices a substantial part of their fare. The kea, strange, terrible bird, nesting high up in mountains where ice and snow abound, has gone mad in a fatal direction. It has become a sheep-killer! White men and their sheep are recent importations into New Zealand, where parrots have been from time beyond knowledge; yet within recent years the keas have become enemies of sheep.

How the evil practice started no one can tell. One suggestion is that the birds were accustomed to dig for insects with their beaks in a wool-like moss. A more likely theory is that the birds developed a taste for flesh, eating scraps of meat and sheepskins left about. They settle on a sheep's back, delve with their hooked beaks through the wool and deep into the flesh, working on till they expose vital organs and cause the poor sheep to die in misery. The evil has become serious and widespread. Out of four hundred sheep left by one farmer in pasturage for the winter, over two hundred had been slain by the keas when he went to count his flock in the spring.

It is a little singular that the next-of-kin to the nestors are the charming Lories and Loriquets. We do not find them in New Zealand, but in the Australasian and Polynesian region. They all have a brush-fringe to the tongue, and as they are handsome, gentle and amusing, they are loved in human homes. The lories are the larger, and the loriquets the small species, though Swainson's Loriquet measures a foot, including the five-inch tail. This Swainson beauty is the handsomest of all Australia's great parrot group.

Who shall tell a parrot from a cockatoo? Yet there need be no difficulty. Apart from the distinctive crest there is an unfailing clue in the beak. The lower part of the beak in the cockatoos is not smooth or marked by little transverse ridges as in the parrots; it is grooved, like a file.

HOW A QUAINT COCKATOO GETS ITS FOOD FROM A ROCK-LIKE PRISON

King of the cockatoos is the Great Black Cockatoo, or Ara, as big as a raven, but with a larger tail. It is a fantastic bird with a huge beak which holds a little worm-like tongue, pink and tipped with black; but there is a purpose in this beak. It masters the rock-like shell of the kanary-nut—the product of a huge forest tree—as easily as we should crack an almond. But we, to get at the kernel which forms this bird's food, must use a hammer. Most cockatoos, however, are white or whitish, though often tinged with red or orange. They do not talk well.

Cockatoos have prospered greatly in the Australian region, which gave them birth and is still their home. But we must leave them with this glance and come to the true parrots. It is a tremendous collection of birds. There are pigmies, natives of New Guinea, actually smaller than an English sparrow. They have tails, which must be of service to the birds in climbing and supporting themselves on the trunks of trees.

MEMBERS OF THE PARROT FAMILY

Sulphur-crested Cockatoo.

Black-and-yellow Macaw.

Hyacinthine Macaw.

Bare-eyed Cockatoo.

Love Bird.

Leadbeater's Cockatoo.

African Gray Parrot.

Hanging Parrot.

Kea.

Rose-crested Cockatoo.

Green Parrakeet.

Budgerigar.

The Triton Cockatoo.

In South America we find the macaws. They are the showiest of all the parrots. In general they are large, but their tails give them a suggestion of prodigious size. The Blue-and-Yellow Macaw is the commonest, the Red and Yellow the gaudiest, the Blue one of the rarest. It is notable for the fact that in place of the usual hole in a tree for a nest it mines a burrow in the bank of a river. The Severe, the Military, the Noble, the Hyacinthine and Spix's macaws are of the sorts coveted because they are harder to obtain.

THE BAT-LIKE HABITS OF THE CAROLINA PARRAKEET

All these macaws are great choppers-up of nuts. The great black cockatoo cuts his hard fare in slices—shell, kernel and all; but a blue macaw picks up a tough palm nut, which we could never penetrate without tools, and pulps it like a cherry-stone.

Next we have some thirty species of South American parrakeets, or paroquets, as they are sometimes called. They are slighter birds and smaller. The Carolina parrakeet is a foot long, gorgeous in green shading to yellow, with the head and cheeks a ruddy orange and the neck as yellow as a golden canary's. Their sociable habits resemble those of bats, but their homes are in great hollow trees, where they hang huddled up together, gripping the surface with claws and beak even when asleep.

This is the only North American parrot. Formerly it ranged as far north as Lake Erie, but now it is found only farther south, if found at all. It is almost extinct, if indeed any at all are left.

For some reason certain of the parrakeets have developed slender, narrow beaks, and branch off into a species by themselves. Of these the Gray-breasted Parrakeet is equally famous and distinct by making a true nest in trees, or rather many nests together. They even run great communal nests into one, with many entrances and exits in which a score of birds may incubate their eggs—a clumsy beehive of a nest.

REGIMENTS OF PARRAKEETS RAID THE CORN- AND RICE-FIELDS

Aviary-keepers welcome the Green Parrakeet because of its good health and spirits, and its tendency to increase its numbers. Where man has made his home in the region where they abound the bird is much dreaded. It is so prolific, it forages so boldly in regiments, that its visits to growing corn and rice fill the cultivator's heart with despair—as if locusts were dropping down in swarms from the unpitying skies.

We must note the resplendent Amazon parrots, and remember that the family has also an African representative. Some forty species are known, most of them denizens of the enormous valley of the river whose names they bear.

Guilding's Amazon, however, is a native of the island of St. Vincent, and is one of the survivors of a calamity which not many years ago shocked the entire world. The eruption of the volcano Mount Soufrière destroyed men, women and children, buildings, animals and birds, but a few of Guilding's Amazons fled to safety.

The Hawk-billed Parrot, with strange coloring and a unique ruff at the back of the neck, looks as if it were a ferocious specimen, but it is gentle and reliably affectionate in captivity, and also a good talker.

THE GRAY PARROTS WHICH KNOW THAT UNITY IS STRENGTH

The Gray Parrot is the prime favorite of all whose hearts go out to the parrot tribe, as they are the best talkers. They are at home in Africa and Madagascar, and New Guinea has one species. It is a pity that they must usually live alone when they are captured, for their nature is to live in flocks. They have single nests, but in case of an attack by an enemy too strong for a single pair, the whole clan unites in battle array, and woe to an intruder. At liberty they live entirely on fruits and palm nuts. It is the males which talk most, but the females which talk most distinctly.

They are often killed in their cages by misdirected kindness; given no water, denied the pieces of wood they love to nibble, fed on fats and table scraps which are fatal to their digestion, and with no sharp grit in their rations, they are doomed. Properly treated, however, they live in houses for threescore years and more, and are marvels of amusement and a sort of monkeyish sportiveness.

Madagascar has a curiosity in parrots, the Vasa, a bird whose black-and-sable raiment gives it the appearance of a crow at a distance. It looks too dignified to

WISE OLD OWLS OF MANY LANDS

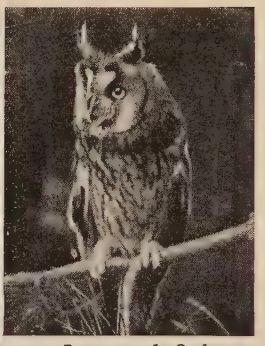
Great Horned Owl.

Fraser's Eagle Owl.

Milky Eagle Owl.

The Little Owl.

The Snowy Owl.



Long-eared Owl.

Mexican Barn Owl.

The Tawny Owl.

The Burrowing Owl.

African Fish Owl.

Australian Barn Owl.

The Ural Owl.

talk, yet it talks like all the rest of the tribe, once liberty and shyness are forgotten. We know little of this bird's ways in nature, and still less of the black Papuan Parrot.

Among the jolliest small members of the family are the Love Birds. Several species from Africa, the East Indies or South America are called by this name. All are small parrots, stumpy in body and short of tail. They are common in all aviaries where parrots find a lodging. Their name is given them on account of their affection toward one another, and also from the fact that if one of a tame pair dies, the other generally declines and sinks into an early grave—dead of blighted affection we probably think. The truth is different, yet sad: the disease which has killed the first is generally implanted in the second also. His little lease of life beyond that of the mate is simply proof that the stronger of the two has survived.

THE LITTLE VISITORS FROM AUSTRALIA THAT NESTED IN OUR WINTER

Even greater favorites than the love birds are the Budgerigars, though they are sometimes called love birds also. Their long tails make them look quite big birds, but in reality they have bodies no bigger than that of an average canary. These are the parrots that you sometimes see "telling fortunes" on the street or at a fair.

They are Australian birds, accustomed to a summer which occurs when winter is with us. The consequence is startling when they first come over. They nested with the writer about Christmas, and brought off their first five young when snow lay three inches deep on the ground. Yet they throve, and were never sick or unhappy except on first nights out of the nest.

We pass to the Hanging Parrots, so named because when they rest they have the quaint habit of suspending themselves upside down and sleeping with their heads where we should expect their feet to be. Honey, flower-buds and tender shoots are their food, but they frequent pots set to catch palm-juice, and this has an intoxicating effect on the pilferers, so that they are often caught before they recover their senses. Even at the best of times they are sleepy little fellows, and we must view their practices with suspicion.

AN OWL-LIKE PARROT WHICH IS BECOMING EXTINCT

There are many other species in this Parrot Family, but we must leave them with the Kakapo, or Owl-parrot. Like the ostriches and the penguin, it has lost the power to fly. It has lived in a New Zealand paradise where no dangerous mammal was till man arrived with the dog, the rat and the cat.

Wings it still retains, but the great breastbone to which the huge muscles of flight must anchor is wasted to half its proper size, and the kakapo can never again be a true flier. In quiet glades it may show itself by day, but in the main it is driven to feed by night, to run up and down trees, to forage among the grass, never returning to anything nearer true flight than a flop downward from bough to bough or from tree to ground.

Unless man saves it, this errant bird will perish utterly within a generation. Pigs and dogs and other animals, to say nothing of human gourmands, have eaten the greater part of the myriads which once roamed in company with the giant moa.

THE MAJESTY OF THE OWL AS WE SEE IT IN THE NIGHT

We have worked our way along this living trail of birds till we have met in the kakapo an owl-like parrot, and now we reach the owls themselves, the shrieking night birds of prey, the subject of legends and fables which have made nations in all ages tremble with unreasoning horror. The fact can be explained on two grounds. Owls are mainly creatures of the night. They are silent as thought on the wing; they haunt old ruins, dark trees in deep woods and dim barns, where great rats scuttle and scream. So foolish man has woven the owl into grim tales of death and terror.

The large head, the cruel beak, the eyes brought forward for piercing vision, the disks of feathers in which the eyes are set, the tufts of feathers which sometimes crown the ears, the powerful legs and feet are all features to impress the timid. But we usually see owls by daylight when they are not at their best. It is at night when their majesty appears, when the great eyes collect the little light there is.

They are among the most widespread of all birds. Wherever there are plagues of shrews or field-mice there come the owls.

They flock in from all parts, drawn by we know not what natural telegraphy. They breed quickly on their unbounded diet. Not only do they produce more eggs at an abnormally rapid rate, but the eggs themselves are bigger, so that to us when we deprive them of the means to a meal, but when we are sleeping, and leaving our substance to the mercy of rats and mice, to shrews and rabbits, beetles, slugs and moths, it is the owl that is guarding our interests. A few of

A Meeting of Parrots—From the painting by Henry Stacy Marks.

combat a plague of vermin they furnish more, larger and stronger owls for the fray. Owls swallow their prey whole and afterward throw up the parts they cannot digest.

Owls may attack us when we rob their nests—they would be poor-spirited creatures if they did not. They may attack the larger owls sometimes eat poultry, and they do eat some birds, but the greatest part of their food is made up of our enemies. The wise farmer leaves spaces in the walls of his buildings for barn owls to enter and leave, and he could have no better guardian.

An immense sensation was created

some years ago by the report of "luminous owls" in England. The naturalist's explanation is that the birds were truly luminous, simply from rubbing against phosphorescent material in rotting wood.

The Tawny Owl is common over most of Europe and extends into Africa and Asia. It is a true wood owl, and its haunting note can be heard a long way. The nearest American relative is the Barred Owl, called also the Hoot Owl. This is also a woodland bird, and its strange call can be heard a mile.

The Long-eared and the Short-eared owls are found both in Europe and in America, and the same is true of the little Saw-whet, or Acadian Owl. All three species hunt mice vigorously. The common Barn Owl, or closely related species, may be found on both sides of the Equator. We tell you more of our owls in the chapters on the Birds of North America.

The little owl of America that lives in a hole

Wherever owls can live, there we find them, some everywhere, some restricted to jungles, some common to a continent, some chained by destiny to the desert, some peculiar to Indian regions. There are more than two hundred species. The largest is the Gray Owl, of the Arctic, with wings five feet from tip to tip. The smallest is the Elf Owl, of Mexico and Texas, about the size of a sparrow. The Snowy Owl of the Arctic regions is not much smaller than the gray owl. It dislikes settled countries, and comes southward only when forced by hunger.

There is a little owl in America which has followed the lead of many harried mammals, and taken to the ground for its home. This is the famous Burrowing Owl, a nine-inch specimen—not a Titan for the work, but burrowing owls are wise in their generation, and share the homes which other powers have made—the homes of burrowing rodents. They not only lodge with their hosts but board with them, *on them,* in fact, for they eat the young of their entertainers, and occasionally add a meal of rattlesnake when those deadly reptiles seek part in the underground community.

The hawk owls that attack the lemmings on their march

Turning again to birds of larger stature, we have the Hawk Owls, of which an Australian species dines on young koalas, the animals the Australians call the bear. The other representatives of the hawk-owl group range from Northern Europe, through Asia, to Northern America. They are bolder and hunt by daylight. The little birds circle round to mob them. It is the hawk owls of Northern Europe that generally head the attack on the moving myriads of lemmings.

If the Eagle Owls chose, they might be as active when the sun is up. Indeed, they do sometimes hunt by day, though commonly they are creatures of the night. Perhaps it is as well that we do not see too much of them in the day, for they are as fierce and bold as any bird that breathes. They are great ear-tufted creatures, sometimes twenty-eight or more inches long, so strong and daring that they include in their prey the fawns of deer, as well as full-grown hares and rabbits, birds of many kinds, with a reptile by way of variety. We also call our eagle owl the Great Horned Owl.

Man's most valuable friend among the birds

The bird is superbly fitted for its work. All owls are. Think of the equipment of the Fish Owls of Africa and India. Their feet have horny spicules. The lion and the tiger have such things on their tongues to rasp flesh from the bones of their prey; the owl has them so that when he makes his plunge and grasps a fish in the water his slippery prey shall not escape.

Several hundred species of birds make up the families we have looked at quickly here, though it is probable that many of these species are not really distinct. They have their appointed work, serving us by seeking their own ends. If we interfere, an eye or a cheek may be torn; if we leave well alone and the owl to his business, life will be fairer for the owl and for ourselves, though uneasy and precarious for the enemies that consume our stores of food.

The owl is as carnivorous as a wolf, and, knowing that, and all the counts for and against it, a high authority finds that the owl is the most valuable to man of all birds. But the wise old owl takes no heed of the tribute. He is busy to-night with some mice, and to-morrow he will have an appointment with some rats. May his natural ventures ever prosper!

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 3753.

BEAUTIFUL BIRDS OF THE WORLD (I)

1. Superb Fruit Pigeon. 2. Pennant's Parrakeet. 3. Chestnut-backed Babbler. 4. Red-necked Tanager. 5. Bluebird. 6. Columbian Cock-of-the-Rock. 7. Orange-breasted Flower Pecker. 8. Blue Creeper. 9. Double-collared Aracari. 10. Pompadour Chatterer. 11. Horned Parrakeet. 12. Prairie Chicken. 13. Yellow-fronted Manakin. 14. California Quail.

1. Blue-and-yellow Macaw. 2. Great Bird of Paradise. 3. Red-and-blue Macaw. 4. Beautiful Lorikeet. 5. Splendid Grass Parrakeet. 6. Mocking-bird. 7. Swainson's Lorikeet. 8. King Bird. 9. African Shrike. 10. Baltimore Oriole. 11. Black-capped Lory. 12. Sultan Tit.

1. Black-and-yellow Broadbill. 2. Blue Wren. 3. Blackburnian Warbler. 4. Cardinal. 5. Scarlet Tanager. 6. Mexican Quezal. 7. Red-billed Toucan. 8. Lyre Bird. 9. San Domingo Tody. 10. Australian Wren. 11. Bobolink, or Rice Bird. 12. Red-headed Woodpecker. 13. Yellow-headed Broadbill. 14. Cliff Swallow. 15. Gurney's Pitta, or Ant-thrush.

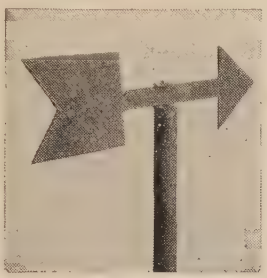
1. Weaver-bird. 2. Red-shouldered Parrakeet. 3. Pink-crested Bee-eater. 4. Violet Gallinule. 5. Golden Conure. 6. New Guinea Broad-billed Flycatcher. 7. Puff Bird. 8. Sun Bittern. 9. Australian Jacana. 10. Central American Boatbill. 11. Blue-faced Barbet. 12. Lafresnaye's Bee-eater. 13. Regent Bower Bird. 14. Cinnamon Teal.

HOW TO STUDY THE WEATHER

CONTINUED FROM 3510

WHEN we think of the changes in the weather day by day it seems a most difficult thing to tell what it is going to be like to-morrow. Yet in the newspaper every morning we can read a forecast of what is going to happen during the day. Although we cannot all have the wonderful instruments with which men foretell the weather, it is possible to construct a few devices with very little trouble.

In order to find out the kind of weather that is coming it is necessary to discover whether the air around us is damp or dry. If there should be a great deal of moisture in the atmosphere, clouds, made of countless particles of moisture, are readily formed, and rain is likely to result. A piece of ordinary brown seaweed hung up on the wall of a room will tell us whether the air is damp or dry. When there is little moisture about, the weed will be crisp and hard, but just before rain comes it will be damp and flabby.



1. Weather-vane cut in wood.

Another important matter is the weight of the atmosphere. Over every object in the world there is a great column of atmosphere, so to speak, miles in height. We get so used to the pressure that we do not notice it, but it is there all the same.

Now, the weight of air varies from time to time, because when the atmosphere is very moist it is lighter, while when dry it is heavier. On this account it is very necessary that we should know the changes in the pressure of the air.

2. Barometer made of jar and oil-flask.

3. Rain-gauge made of a bottle and a funnel.

The barometer is an expensive instrument; but with a glass jar and an oil-flask we may make a device that will tell us a good deal about the weight of the air. Fill the jar about half full with water. Now place the empty oil-flask neck downward into the water in the jar, as seen in picture 2. The water will rise up some distance in the flask. From day to day the height of the water will vary, and, indeed, it will be responding to the pressure of the atmosphere on the water in the jar. When the air is dry, and therefore heavier than usual, the water will be higher than when the atmosphere is moist and light. Thus we may expect fine weather when the water in the flask is high, and we may expect storms when the water is low.

Animals are very sensitive to weather conditions. When it is likely to stay fine, leeches will remain quietly in the bottom of a jar, while at the approach of a storm they will become very restless. A frog in an aquarium keeps to the bottom of the water if the weather is going to be stormy, while in fine weather he will enjoy coming to the surface.

It is always interesting to know which way the wind is blowing. In some parts of our own land when the wind blows one way it will not stay fine very long, and wind from the opposite direction means dry weather. It is easy to cut out a weather-vane in the shape of an arrow from a piece of flat wood, as seen in picture 1. If

we drive a nail exactly through the centre of the shaft, the vane may be fastened on to a broomstick, and the pole then fixed in an open place, such as the top of a summer-house, or from the upright branch of a tree. By watching the movements of the sun, or by using a small compass, we can readily find out which is the east, the west, and so on.

It is easy also to keep a record of the rainfall. With a narrow-necked bottle, holding about a quart, and a funnel with an opening the same size as the bottom of the bottle, we can make a very simple rain-gauge. The end of the funnel is put into the neck of the bottle, and the whole thing is left to stand in the open, perhaps on a lawn. The rain-gauge must be left out night and day, of course, and at the end of twenty-four hours we must look and see whether any rain has fallen or not—of course, emptying the bottle each time. The bottle used should be one with a flat bottom, and not one with a raised bottom inside. If after a storm there is an inch of rain in the bottle, that is the depth of rain that has fallen.

But it may not, perhaps, be easy to get a bottle and a funnel exactly the same width, and in that case it will be more difficult to measure the rainfall. It would seem that if we use a funnel 12 inches wide, catching the rain falling over a width of 12 inches of space, and then measure its depth in a bottle 6 inches wide, the depth in the bottle ought to be twice the real depth of the rainfall. A moment's thought will show why this is not true. If we think of the bottle and funnel as square we shall see that the area of the mouth of the funnel is four times as great as that of the bottle. It is very easy to find the area of a circle if we will only remember one little rule. It took wise men a long time to find it out. Here is a rule regarding areas which at first sight may seem a little difficult, but which is quite easy. It is:

Area = square of diameter × 0.7854

This means that to find the square inches within a circle we must multiply the diameter of the circle in inches by itself, and multiply the result by 0.7854. Now, suppose that the bottle is 3 inches in diameter inside. We multiply 3 by 3, giving us 9, and then we multiply 9 by 0.7854, and the result is 7.0686. The fraction is so small that for our purpose we may disregard it, and say that the area of the surface of the water in the bottle, or of the bottom of the bottle, is 7 inches. Now, let us suppose that the measurement across the mouth of the funnel is 8 inches. We multiply 8 by 8, giving us 64, which we again multiply by 0.7854, and get for answer 50.2656. This is just a very little more than 50 square inches, and we may count it as 50 square inches.

Now, if the amount of rain water which has fallen in the bottle measures 1 inch in depth, we have to find what it would be in a bottle of the same diameter as the mouth of the funnel. To do this, we multiply 1 inch by 7, and divide it by 50. This gives us almost 1/7, so we say that 1/7 inch of rain has fallen. Whatever the diameter of the bottle and of the mouth of the funnel may be, we can find the amount of rain by following these rules, and if we know the size of a garden or of a field, or even of a county, we can tell, by working it out, what *weight* of water has fallen over the whole area. The rule to work upon is that 27¾ cubic inches of water weigh 1 pound.

HOW TO SAVE TREES BY TREE SURGERY

DO you know just what is meant by tree surgery? Due to careless methods of cutting limbs from shade or fruit trees and to the fact that when limbs are blown from these trees no attempt is made to protect the resulting wound, rot often develops, so that the tree is in danger of destruction. However, there has recently been found an excellent way to preserve the trees that have been attacked by rot by filling these cavities with concrete. If this work is properly done, the trees may be given considerable extension of life. In extremely large cavities, it is sometimes necessary to reinforce the concrete, in which case chicken wire, bolts, small iron rods, or nails may be used.

Before filling the cavity with concrete, it must be cleaned out so that all diseased portions are removed and all fungus growth destroyed. This is done by cutting and scraping down to good, live wood, and coating the inside of the cavity with a solution of either copper sulphate or creosote. If the cavity is a large one, this treatment is followed by painting the cavity with hot tar to form a spring or expansion-joint cushion which prevents the wood from cracking the concrete after it is placed. If the cavity is an open one from which the concrete may become loosened, the concrete may be firmly fixed in position by driving 20-penny nails part way into the wood all around the opening. In larger cavities rods, bolts or wire mesh may have to be used to keep the concrete from cracking under the bending of the tree due to the wind.

Concrete for filling the cavity is mixed in the proportions of 1 sack of cement to 2 cubic feet of clean sand and 3 cubic feet of clean, well graded pebbles or broken stone. Enough water is added to form a doughy mixture which is firmly packed in the cavity. If the cavity is quite open, so that difficulty is encountered in placing the concrete, canvas or burlap may be wrapped around the tree to hold the concrete in place until it has sufficiently hardened. Within a day the canvas or burlap may be removed and the exposed concrete surface given a coat of cement paint. This is made by adding water to pure cement until the mixture is about the consistency of cream.

The cavity should be properly cleaned, and the surrounding bark should be cut back all around the opening for at least ½ inch from the face of the cavity. The growth of the tree will then eventually inclose the concrete. The concrete filling will keep out moisture and preserve the tree for many years if these directions are carefully followed.

DOLLS OF MANY NATIONS

The colored plate showing the dolls is opposite page 3510.

GRETA—THE LITTLE SWEDISH DOLL

ON page 3510 we are told how to dress the French and German dolls. This time we are going to see how a little Swedish doll should be dressed. First of all, we must know that the climate of Sweden is much colder than ours. Though they do have warm weather in the summer-time, just as we do, it is generally much more snowy and icy in the winter. So that explains why they wear such thick stuffs and warm clothes. The girls and women are very industrious, and fond of fine needlework. They make very beautiful embroideries for their houses, and decorate their own and their children's clothes with dainty needlework in wools and silks. They make delicate little patterns on the children's caps and bonnets, and think nothing of embroidering a small coat *all over*—sleeves and back and front as well. Their table-linen and household things are always beautifully worked. When they go out to tea it is the custom to take some needlework with them, and they all do so. Some of us would be put to shame if we saw the large amount of beautiful needlework the Swedish children do.

When a girl is going to be married, sometimes her friends arrange together to work a quilt for her. They collect small squares of plush or other rich material; each one takes a piece home, on which she embroiders very beautifully her own Christian name. Afterward all the squares are sewed together, and the bride has a loving souvenir from all her girl friends.

Of course, there are different variations of this costume peculiar to different parts of the country of Sweden.

This doll's name is Greta—pronounced just as it is spelled.

As the picture shows us, she wears a white shirt of fine muslin gathered into a straight neck-band; scarlet vest, made of red and black striped silk, buttoned together in front with gold buttons. A piece of red silk, with black lines made on it either with embroidery or braid, would give the right effect, if we are unable to get the right kind of silk. The kind known as English silk can often be bought striped alternately red and black, and it is quite cheap.

The pocket.

The jacket is made of dark bluish green cloth, and here comes in the embroidery, which goes all over it in a pattern composed of triangles and lines—not at all a difficult one to copy. It is worked in black wool, the triangles filled in, and the lines outlined. It will be found better to cut out the coat a plain, tight-fitting shape, embroider it, and then sew it together afterward. It might be lined either with thin silk or muslin.

The skirt is full, made of black cloth, with a scarlet hem, also of cloth. The apron is dark blue, and not of cotton, as we have them, but of cloth. On the cloth is a pattern of fine white lines, which may be suggested by cotton threads run evenly through the surface.

The pocket is the most fascinating detail. It is dark blue or red at the back, with a white front forming the pouch part, ornamented with pieces of the red cloth cut out in shapes sewed on with white thread; the stitches show and form white spots or crosses round the edge of the red shapes.

The cap is red satin, with yellow and blue flowers and leaves embroidered on it. It is in shape rather like old Puritan bonnets, but more open at the back, showing the hair well, and pointed in front.

The Swedish people are very fond of embroidery. Just notice how much there is on this one costume.

The shoes are black, with tongues and buckles, and the socks are white.

FILOMENA—THE LITTLE ITALIAN DOLL

IN beautiful Italy there are, of course, many classes of people, just as there are in our country, but it is only among the peasant class that we shall be able to find a typical or distinctive costume. The town folk dress much as we do. The dress we can see in the picture is one that would be worn by a little fisher girl. Her name is Filomena. When buying the doll, we must try to find one with dark hair and eyes and an olive-tinted complexion, because we have to represent a little girl who spends many hours of her time in the open air and bright sunshine. So she must have a brown skin and a pretty pink color in her cheeks.

To describe the frock, we shall start at the top with the headdress, which is made of a square scarf, either white or any gay, light color. We shall choose red, with an orange-and-blue border. It should be folded cornerwise and placed on the head with the two corners which come together hanging down at the back, and the other two—which are folded in half—hanging at the sides. The side pieces are then raised to the top and secured there with a fancy pin.

Next comes a pair of red coral earrings, and a coral necklace to match.

Filomena's blouse should be made of fine white lawn, made very simply, and gathered at the neck into a narrow band. The sleeves are long and full, and are finished with a narrow cuff. The skirt is made of the same material, trimmed at the hem with a couple of rows of bright scarlet braid. The skirt should be made full and loose.

The little corselet, which is quite a feature of all Italian peasant costumes, is made of black velvet and drawn together with red laces. We shall not find this difficult to make. We should fit it to our doll, make a little seam down the centre, if necessary,

stiffen it with lines of machine-stitching, so that it will keep quite firm, and work eyelet-holes to thread the laces through. The stockings are of white cotton, and the boots of untanned leather.

DOLORES—THE LITTLE SPANISH DOLL

SPAIN is very often called Sunny Spain, because the climate is warm, bright and full of sunshine. People who live in hot countries always love bright colors about them, in their houses and streets, and on their dresses, while people in colder places generally wear grays, black and other dark colors, so that we must find for our Spanish doll some very bright pieces of material. She will represent a dark girl, tall, and of graceful carriage. The women of Spain are noted for their beauty, and have dark, flashing eyes, so we must try to find a doll to fit these requirements. She must have plenty of dark hair, as it has to be "done up."

This costume is one which would be worn on fête days and holidays by a girl from thirteen to fifteen years old. At other times the girls dress very much as we do. The most noticeable feature is the shawl, which is always brightly colored and has all round it a deep fringe, knotted at the edge and made of fine black silk.

We must get a square piece of soft silk, brightly colored and patterned. For instance, an orange ground with red and green flowers on it, or a pink ground with a small pattern in purple, deep red and blue would do. Sew the fine black silk fringe all around the edge, and the shawl is made. We must fold our shawl from corner to corner, and put it round the doll's shoulders, as shown in the picture, crossed in front, with the ends loosely tied behind. Notice at the same time that the fringe is a deep one in proportion to the size of the shawl; also that it is knotted at the edge joining the shawl.

The bare throat should be decorated with one or two rows of colored beads.

The skirt is a shape such as we ourselves wear, made with a frill at the hem, and just short enough to show the ankles. The frill should be put on in little box-pleats, as shown in the picture.

The stockings are white, the shoes black, held on by the pretty little cross gartering, which can be made of narrow black silk or velvet ribbon. An end of the ribbon should be fixed to each side of a shoe, bring the ribbon round, cross it in front, and tie as shown in the picture.

The cotton apron is striped in several colors—it might be blue, green and red, or perhaps a pink one with mauve stripes; certainly it would be very bright.

The hair, a very important item, must be dressed high up on top, and should have a very tall comb stuck in behind, which shows from the front. A rose of deep red or bright pink will be stuck in on the left side.

It will, perhaps, be impossible for us to get a back comb in a size to fit the doll. As it is a very necessary feature of the costume, here is a suggestion. Get an ordinary back comb with an inch-wide top and fine teeth—perhaps one somebody has discarded because a tooth has broken can be found. Combs can quite easily be cut with a sharp penknife, and the edge smoothed with sandpaper or a nail-file. So with a little patience we shall not find it a hard task to make a back comb to fit our doll.

Sometimes the Spanish girls wear a lace scarf to drape the hair; this is called a mantilla. It looks very charming indeed, but it is not usually worn with a fringe shawl; it accompanies a costume more like our own—that is, a dress with a bodice and skirt as we wear them. It takes the place of a hat, and is always worn at a bullfight, the most popular entertainment in Spain.

PANNA—THE LITTLE HUNGARIAN DOLL

AS in most other European countries, so in Austria and Hungary—it is only the peasants who still keep to their national dress. In Hungary they wear a costume like that of the little girl in the picture. It is very charming indeed, and belongs to the part of Hungary called Croatia. We shall call our doll Panna. She will have a happy little round face, with a healthy color, brown hair and laughing eyes.

Her cap, or bonnet, which we describe first, is one of the prettiest headdresses imaginable. It is made of hand-woven cotton or linen, white or cream, and embroidered very beautifully in the brightest red, green and violet silk it is possible to buy. The shape of the cap is very simple, for it is only two straight pieces of material.

The embroidery to be used on the frock and bonnet, of which we give a design on this page, must be copied as accurately as possible, because it is a very important feature of the costume.

The bonnet is worked in two shades of geranium-colored red—a deep, bright scarlet and a very pinkish red. These are not colors which we should put together, but they are extremely becoming to the wearer. The dark parts in the design given are filled in with violet and a soft grayish green. The silk used is thick and bright. The background is filled in with red, so that no material shows between the pattern.

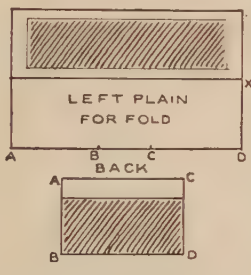
The pattern for the embroidery.

We must use the design once for the back piece, and repeat it twice for the front of the cap. Join up the pieces shown in the picture, making the letters coincide—*AB* on the back to *AB* on the front, and *CD* on the back to *CD* on the front. The little hole which is left is filled in with lace stitches, the effect being very like drawn-thread work. The most curious part of the cap is the "fold." The part from *X* to *D* is doubled back, bringing the embroidered half of the front to meet the back of the bonnet, and hiding the plain half of the front altogether.

The lace at the edge is of woven brown thread, of a more or less unbleached color, and it is put on just slightly full.

For the skirt and blouse white cotton is used, embroidered all over in a spot pattern. Cross-stitch is used, and the colors are black and red. Note well how the pattern is arranged in the picture, and also observe the shape of the skirt and blouse. The sleeve is finished with a frill at the wrist, and the skirt is just gathered into the waist.

The coat, which is quite plain in shape and without sleeves, is made of dark blue cloth lined with red silk. The edging is a strip of white cloth "pinked" out to form a border, and put on in between the lining and stuff, so that it stands out all around the edge of the coat. It only differs from the ordinary pinking which we have on our lampshades in the little hole in each point. The two rows of very tiny buttons are silver in color, and very bright.



The bonnet pattern.

The little apron matches the dress in color and material, except the border which edges it, and which is used again a few inches higher up.

The sash is a woven wool, or cotton braid, in bright colors—we call it "galon."

Panna wears a necklace of big red and black beads, threaded alternately—first a red and then a black, and so on.

SARAH—THE LITTLE ARMENIAN DOLL

THE complexions of the Armenian people are olive, the hair black, the eyes dark, and the women are noted for their long lashes.

Altogether they are considered a handsome race, though their features are large. Our picture shows a little Armenian girl whose duty it is to fetch water in the beautiful earthen pot which she slings over her shoulder by a cord, for there are no water-pipes in Armenia.

Her costume is of cotton material—it is hot in the country where she lives, so she will not dress in thick material; the skirt is full and hangs in flutes all round. It is cut several inches off the ground in length and shows her bare feet and ankles.

The stuff is beautifully patterned in rich colors in what we usually call the "pine pattern." The little bodice which joins the skirt (they are sewed together at the waist) is a plain, tight-fitting affair, with long sleeves coming to the wrist, where they fasten with a small, plain cuff. It has no collar, and it is fastened in front with a few buttons. Over this she wears a coat made on the same principle as the costume. It has a full skirt joined to a plain top. The coat-skirt is shorter than the dress-skirt, and the coat-sleeves are short, coming to the elbow, and finish with a narrow frill of the material, which, by the way, is a dark blue or dark purple cotton.

Over the coat she wears an apron. There is plenty of stuff in the apron, but it is all gathered in so closely that it does not cover up much of the front of her dress. It is made of white cotton with a wide border of blue or patterned material.

The headdress is very simple—just a brightly colored handkerchief or square of cotton folded round the head.

AHWEAH—THE LITTLE ESKIMO DOLL

WE all know where the Eskimo people live —right up near the North Pole, where it is always cold and the winters are long and dark. It will not take us long to guess, when we think of this, how these people are dressed. Of course they are wrapped up in fur, because there is nothing else in the world which keeps one so warm and cozy as fur does. The people are very strong and rather plump. They are decidedly small in stature, and have small hands and feet. Their complexions are swarthy—by that we mean, of course, that the skin is a pale yellowish brown—and they have broad, flat faces, with eyes that slant in a way that reminds one of the Japanese or Chinese.

The strangest part about the Eskimo costume is that the men and women are dressed alike, both wearing trousers, boots and gaiters. The only difference is that sometimes the lady wears a few beads.

The garments themselves are quite plain in shape, and the only ornamentation is a white skin sewed into the middle of the front. A pointed piece of fur, either cut from the tail or head of the animal, makes a sort of little tab or finish at the bottom of the front of the coat. The cuffs are white, too, to match the front piece.

The hood is a warm, tight-fitting one, coming closely round the face, and it has a little point sticking up behind.

The little girl shown in the picture, whose name is Ahweah, wears, of course, trousers to keep the cold from her legs. They are stuffed inside the top-boots, which are made of leather, with good stout soles to keep the wet out. The gloves are of leather, too,

and have a thumb-piece only, like a baby's gloves.

Her hair, which is jet-black and very straight, is braided into two tails as soon as it is long enough. In the front it just hangs in little straight pieces over the forehead, and is decidedly irregular in length. The Eskimo boy has his hair cut off in a straight line across his forehead a short distance above his eyebrows, but the back grows long just as his sister's does.

LITTLE DUTCH DOLLS—PIETER AND WILHELMINA

BEFORE we begin to dress these dolls we must look at the picture very closely. We shall begin with the boy doll. This costume is very easy to make, because it is a very simple one, loose and comfortable as well as warm. We shall see that he has extremely baggy trousers reaching to the ankles. These should be made of dark blue cloth, and cut very full indeed. His coat is of dark gray cloth, buttoned up to the neck. Underneath is a red striped waistcoat, the collar of which can be seen just peeping above the coat. At the waist are worn two silver buttons, always as big as can possibly be afforded. Sometimes they are like small saucers and stretch right across the body, but most little boys can get them only the size of a half-dollar.

At the throat the red waistcoat is fastened with two gold-colored buttons, and the buttons which fasten the coat are of silver. The buttons of a Dutch boy are his jewelry, and a very important thing with him.

Pieter's hat is a felt or cloth one, round in shape and fairly tall, but with no brim. This must be made to fit his head. Cut a small circle of cloth for the crown, and to this join a straight piece—that is, a strip as long as the circle is round. Then make the join as invisible as possible, and the cap is complete. These hats are like a thimble in shape, tapering a little toward the top.

The wooden shoes—sabots, they call them—can be made out of thin cardboard or canvas glued together, if we cannot find a pair of real wooden doll's sabots. They are often to be found for sale in toy-shops, however, and are quite cheap.

Pieter must, of course, be a boy doll, with short hair. The hair ought to be straight. He is fair, and has a healthy, "fresh-air" complexion.

The little Dutch girl's cap is made of white lace or embroidered muslin. It fits tightly to the head, and has wide side pieces which turn back from the face and form flaps, or "wings." These caps are stiffly starched to make the wings stand out, so we must make ours of stiff muslin. If we use lace, we shall have to insert a fine wire at the edge or it will not stand out.

The bodice is tight-fitting, with elbow-sleeves. The square vest in front has an inner chemisette of white, and is bordered with a band of plain or differently colored material from that of the bodice itself, which is a patterned cotton. Round her throat the Dutch girl wears a handsome necklace of corals, several rows held together in front by a large gold clasp.

While in America the women try to look slim, the Dutch lady, to be really well dressed, must look as big as possible. She must try to appear quite fat, and the more woolen petticoats she wears the better! It is the fashion in Holland to have a lot of petticoats. The skirts reach only to the ankle, and the petticoats are cut the same length, so that when she walks the Dutch girl swings her skirts to and fro, and the petticoats can be seen. The richer the lady, the more petticoats she wears. Therefore, we must make our doll plenty of thick petticoats and a dark cloth skirt. Make them all very full, gathered in all around the waist.

The apron, which should be white or blue, has a piece of check material at the top. We can see how this is done in the picture. Notice that there is no bib as we have, and that the fastening is a plain band, very narrow, buttoning at the back. The sabots are the same as the boy's, and an American doll, either dark or fair, will represent Wilhelmina.

We should remember that there are very many different kinds and colors of costumes in Holland, some, of course, much more elaborate than these, but they all bear a "family likeness" to the Dutch costumes described here.

The Dutch people wear, perhaps, the quaintest and prettiest costumes of any.

IVAN—THE LITTLE RUSSIAN DOLL

RUSSIA is such a large country that in different parts of it the climate varies from quite hot to quite cold. On the whole, however, it is considered a cold country, and in Leningrad, the capital, they have very severe winters; they are so cold that the river freezes over until the ice is strong enough to bear the weight of horses and carts. Then people bring out their sleighs and carts specially fitted with flat pieces of steel, like huge skates, instead of wheels. These glide along the ice road made by the frozen river, going along at a tremendous speed.

It is easy to understand that people need very warm clothes for these ice journeys; in fact, everyone who can possibly afford it wears furs.

Not only is the hair of the fur warm, but the leather from which it grows also keeps out the cold. And so we are going to dress little Ivan in fur.

We must get a little boy doll, with short hair; in fact, one just like a little American boy in hair and complexion. First of all he will wear a little navy-blue sailor suit, like those our boys have, but he will wear top-boots with it.

We shall be able to make these out of a piece of soft kid or leather. Notice the shape of them.

Next we come to the overcoat, which is

like ours in shape, but lined and trimmed with fur. The fastenings are "froggings" of black woolen braid and arranged as shown in the picture. Any thick dark cloth will be suitable for the coat. The collar and cuffs are made of long fur, and the lining of a shorter kind.

The little cap, round in shape, fits closely to the head and is made of fur to match the collar and cuffs.

Little Ivan's costume would not be complete without gloves; in such a cold climate the hands must always be carefully protected.

The peasants and poorer people in Russia often use sheepskin instead of fur. So Ivan may have a sheepskin coat. His boots may have a band of fur or sheepskin around the tops.

On page 4081 we learn how to dress the rest of the foreign dolls.

HOW TO IDENTIFY OAK WOODS

PERHAPS you have already had difficulty in knowing whether or not you were following the specification for making a piece of furniture which called for the use of red or white oak. In any case, you will be interested in the following.

Over fifty species of native oaks assume the proportions of trees, and about twenty-five of these are used for lumber. After the oaks are cut into lumber there is no means by which they can be identified as to exact species. By examination of the wood alone, however, it is possible to separate the oaks into two groups—the white oaks and the red oaks. For most purposes, fortunately, it is not necessary to classify them any further. The oaks all average about the same in strength, but those in the white-oak group are much more durable under conditions favorable to decay than those in the red-oak group.

The white-oak group includes: true white oak, swamp oak, bur oak, cow oak, post oak, overcup oak and chestnut oak. The red-oak group includes: true red oak, yellow or black oak, scarlet oak, Spanish oak, Texan oak, black jack, water oak, willow oak and laurel oak. The color of the wood is a ready, but not an entirely reliable, means of distinguishing the white oaks from the red oaks. Red oaks usually have a distinctly reddish tinge, especially near the knots. The wood of the white oaks is generally a grayish brown, but occasionally a reddish tinge is also found in white-oak lumber.

For more accurate identification it is necessary to examine the pores of the wood. These will be found as tiny holes on a smoothly cut end surface, the largest being visible to the unaided eye. They are not of uniform size throughout each growth ring, but are considerably larger in the wood formed in the spring, decreasing in size rather abruptly toward the summer wood. The large pores in the spring wood of the heartwood and inner sapwood of the white oaks are usually plugged up with a froth-like growth known as tyloses, and those of the red oaks are open. This feature, however, is not so reliable for classification as the character of the much smaller pores in the summer wood.

To tell for a certainty whether a piece of oak belongs to the white- or red-oak group, cut the end grain smoothly with a sharp knife across several growth rings of average width. With the aid of a magnifying glass or a hand lens examine the small pores in the dense summer wood. If the pores in this part of the growth ring are plainly visible as minute rounded openings, and are not so crowded but that they can readily be counted, the wood belongs to the red-oak group. If the pores in the summer wood are very small, somewhat angular, and so numerous that it would be exceedingly difficult to count them, the wood belongs to the white-oak group.

In the later volumes we shall learn for what purposes both white and red oak can be used most advantageously.

A HOME-MADE HAMMOCK FOR CAMPING OUTFIT

THE summer calls for a hammock to be hung in some shady spot which is more or less secluded, but one difficulty of including this comfort in the camping outfit for the summer's outing is the bulkiness as well as the expense of the bought hammock. However, less than one dollar for materials and no more skill than the average girl possesses, will make it possible to construct a hammock far more comfortable, durable and attractive than one which may be bought for much more money. Moreover, it may be left out in the rain without damaging it, or washed, if soiled, as safely as a towel. Its main advantage, however, lies in the fact that it may be folded perfectly flat. Three or four of these might be laid at the bottom of one's trunk, they take up so little space.

First decide how long you wish to make your hammock. Two and a half yards of material will furnish one large enough for any person. If this is the length decided upon, you should buy 2½ yards of 8-ounce cotton duck, a spool or ball of linen thread, a piece of beeswax, and 2 small steel or iron rings.

Then turn down a 4-inch hem at each end of the length of material, wax your thread, and backstitch this firmly with large stitches, after having turned in a liberal ½ inch to afford a good "hold." An inch and a quarter nearer the end run a second line of backstitching. Your hammock will look like a curtain with a hem and rodcasing at each end. Now smooth out each end in turn on the table, and in the 1¼-inch space draw five ¾-inch circles, having one at each side, one exactly in the middle, and one in the middle of each space between. The circles at the sides should be not less than 1¼ inches from the selvage to allow for differences in the length of barrel-staves, which are to be used for the "spreaders."

Again take your waxed thread and stitch once, or run twice, around each ¾-inch circle, through the two thicknesses of duck, which are then cut away, but not too near to the stitching. This leaves a large eyelet ready

to be worked. Next lay a loop of waxed heavy twine around the eyelet, and over this work as closely and firmly as possible with waxed thread. This is done just as you would make an eyelet in embroidery, only it is on a larger scale.

Your hammock is now ready to be folded flat and packed with your camping outfit, unless you wish to add a valance. If desired, this is easily done by stitching a 12-inch-wide strip of the same material or of colored denim, or by knotting a fringe of colored cord along each selvage. When you plan to use it, secure two narrow barrel-staves. These are shaved down a little so that they may be run into the broad hems at the ends. A 60-foot length of braided cotton clothesline is cut in half, and each half in turn is cut into five 6-foot lengths. These are each waxed, doubled and put through an eyelet in a firm slip knot, inclosing the "spreader." The ends of all five double lines are then gathered together and put smoothly through one harness ring, below which they are wound firmly with waxed twine. Now this process is repeated at the other end, and the hammock is ready to be placed in a secluded spot for your comfort. A few cushions will be an improvement.

Strong hooks must be fastened to form supports which are sufficiently far apart to permit the hammock to hang loosely between them. These may be purchased at any hardware store.

HOW DURABLE IS YOUR WOOD?

IN response to numerous requests for information on the relative durability, or resistance to decay, of untreated woods, the United States Forest Products Laboratory at Madison, Wisconsin, has prepared the following table from the records and information it has collected. There are not enough records in existence on some of the woods to be conclusive, and the durability figures given should be accepted only because they are based on the most complete data anywhere obtainable, supplemented by observation and expert opinion from many sources.

Of course, no attempt has been made to estimate the relative durability given here in per cent into years of life, since the variety of climate, soil and moisture conditions to which timbers might be exposed would make such data worthless. Individual timbers of the same species may differ considerably in durability, too, according to the amount of heartwood and sapwood they contain and according to their state of preservation when they are placed in service. Under any given set of conditions, however, the average service life of timbers of the different species will probably vary in proportion to the percentages given.

The black locust and osage orange are the most durable of the native woods. When exposed to conditions which favor decay they will probably last almost twice as long as white oak, and from three to four times as long as red oak. Bald cypress, redwood, catalpa and most of the cedars are also highly durable species. Douglas fir, longleaf pine, white pines and western larch average only a little less durable than white oak. Hemlock, true firs, and loblolly, lodgepole and western yellow pine fall considerably lower. The sapwood of practically all species has very low durability.

RELATIVE DURABILITY (RESISTANCE TO DECAY) OF UNTREATED WOODS

The durability of commercial white oak has been taken as 100 per cent.

Conifers	
Cedar, eastern red (juniper)	150–200
Cedar, southern white	80–100
Cedar, other species	125–175
Cypress, bald	125–175
Douglas fir (dense)	75–100
Douglas fir (ave. mill run)	75–85
Fir (the true firs)	23–35
Hemlock	35–55
Larch, western	75–85
Pine, jack	35–45
Pine, longleaf, slash (Cuban)	75–100
Pine, Norway	45–60
Pine, pitch, sugar	45–55
Pine, shortleaf	60–80
Pine, southern yellow (dense)	80–100
Pine, western white	65–80
Pine, white	70–90
Pine, western yellow, pond, loblolly, lodgepole	35–50
Redwood	125–175
Spruce, Engelmann, red, Sitka, white	35–50
Tamarack	75–85
Yew, Pacific (western)	170 plus
Hardwoods	
Ash	40–55
Aspen	25–35
Basswood	30–40
Beech	40–50
Birch	35–50
Butternut	50–70
Catalpa	125–175
Chestnut	100–120
Cottonwood	30–40
Elder, pale	25–35
Elm, cork (rock), slippery	65–75
Elm, white	50–70
Gum, black, cotton (tupelo)	30–50
Gum, red	65–75
Hickory	40–55
Locust, black	150–250
Locust, honey	80–100
Magnolia, evergreen	40–50
Maple	40–50
Mulberry, red	150–200
Oaks, red oak group	40–55
Oaks, white oak group	100
Oak, chestnut	70–90
Osage orange	200–300
Poplar, yellow	40–55
Sycamore	35–45
Walnut, black	100–120
Willow	30–40

In selecting wood for various purposes you will have occasion to refer to this list from time to time.

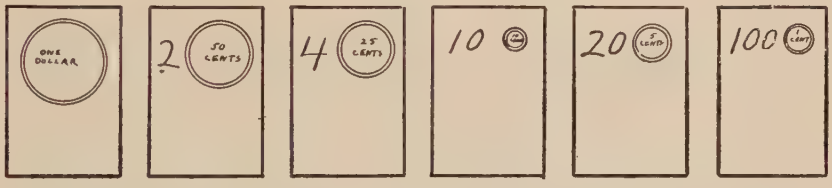
THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 3765.

MORE WORTHWHILE GAMES

CONTINUED FROM 3518

MAKING CHANGE—HARDER READING BOOKS
READING TESTS

IF you are going to play cafeteria and store, you will need to know just how much each piece of money is worth, and all the ways you can make up that much money. You can make a dollar with 2 half dollars, or 4 quarters, or 10 dimes, or 20 nickels, or 100 pennies. Perhaps you have seen the man in the store or in the bank, take a roll of pennies or nickels or dimes all done up in paper, and open it up and put it in the change drawer. They are done up in packages which make a dollar.



In the picture each card shows one way to make a dollar. So on the back of each card we will put $1.00.

The other ways to make half a dollar are 2 quarters, 5 dimes, 10 nickels, or 50 pennies. So on the back of each of these cards we will put $ .50.

The other ways to make a quarter of a dollar are 2 dimes and a nickel, or 5 nickels, or 25 pennies. On the back of these we will put $ .25.

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The other ways to make a dime are 2 nickels or 10 pennies; so on the back of each dime card we will put $ .10.

The only other way to make a nickel is 5 pennies, so on the back we will put $ .05.

Now count your cards and see if you have six dollar cards, 5 half dollar cards, 4 quarter dollar cards, 3 dime cards, 2 nickel cards. You will find the money pictures for this game set on page 138 of your Work Book, and the printed names on page 137.

Perhaps the Stop game will be the most fun with these cards. OR make up a new game. Suppose each leader in turn lays down a card and says "Who will give me change for this?" The first child to give correct change wins the turn.

YOU have been reading harder stories by this time. Have you read all the Primers in the list on page 2391? There are First Readers to almost all of those Primers, with stories a little harder than the Primer ones. Another First Reader is Buswell's; and it has other games in it which you can play.*

You will not need to be tested on every story now, but when you have read about half of the book, mother can test you on all those stories at one time. Pretty soon you will be reading Second Readers, and all sorts of story books.

When you began making your worthwhile games you did not know how to read and write, or how to draw and number very much, did you? But now look at your scores and see how well you have learned to do them all. You can now make your own worthwhile games. You won't need a Work Book any more for you can write your own words and digits and you can draw your own pictures. Whenever you have something to learn that you want to practice on, you can make a practice game for yourself and then get someone to play with you when you want to play it fast and lively.

Now that you have learned so many things to do, there are tests which mother can buy which will tell you how well other boys and girls like you can read, write, draw and number.

* Parker Publishing Company, Chicago.

I hope you have kept all your games, so you can help your little brother or sister or friends who do not know all the things you have learned. With mother's help you taught yourself how to do all these things. Now with your help some little friend can learn all that you have learned.

WHAT HAVE YOU LEARNED

DO you know many things to play out of doors?

Do you know many interesting things to watch out of doors when you go on walks?

Do you know about the trees, the flowers, the vegetables and different things that grow about you?

Do you know how to find out more about them from the pictures in The Book of Knowledge?

Can you write stories about them?

Can you read about them in books that are written for small children to read?

Can you draw the things you see growing about you? How well can you draw them?

Do you know how to choose good things to eat which will make you grow?

Do you know how much food costs in the cafeteria? In the store? Can you read the signs and know how much to pay?

Can you write about money?

Do you know how many ways you can make change for a dollar, a half dollar, a quarter, a dime?

Do you know how to use the common measures?

How far can you jump?

Can you count your score in the jumping games?

Can you write your record and add your score on paper?

Can you play and score the quiet jumping game?

Can you score Just Right on the column addition game?

Can you find words that have the new sounds and letters in your last sets of sound games? Which ones can you find?

Can you read and score on the tests in the whole first list of books on page 2391? How many in the list on this page can you read? In how many can you score in tests? *

Can you help other children learn all the things you have learned to do?

Can you make up new practice games when you know what you wish to learn?

Can you keep records so you know when you are doing better and know how much better you are doing?

A FINAL WORD TO THE PARENTS

PERHAPS you, too, wish to stop and check up on your results. From time to time, as your child is engaged in his activities, you, too, can estimate your progress. You started out to develop standards of behavior. So you have been providing him wholesome activities in which he can develop useful skills. You have provided playmates so that he may find a natural use for these skills. And now what is your child's attitude toward the other children? Is it keenly individualistic and competitive? Is he mostly interested in beating the other children? Some children are interested mostly in their own success. The other children are necessary in the games to give them the opportunity to win. Some children are interested mostly in doing things with other children. They are so interested in the playing and scoring together that it makes little difference who wins. Some children are very much interested in the other children. Whatever they learn to do themselves, they like to show the others how to do, also.

*Tests which can be purchased:

Pressey	Primary Vocabulary	Public School Publishing Company, Bloomington, Illinois
Pressey	Primary Achievement	Public School Publishing Company, Bloomington, Illinois
Ogelsby	Word Recognition	World Book Company, Yonkers, New York
Haggerty	Reading Sigma I	World Book Company, Yonkers, New York
Thorndike-McCall	Reading	Teachers College, Columbia University, New York City
Ayres	Handwriting Scale	Russell Sage Foundation, New York City
Ayres	Spelling Test	Russell Sage Foundation, New York City
Thorndike	Drawing Scale	Teachers College, Columbia University, New York City
Pressey	First Grade Reading Vocabulary	Indiana University, Department of Psychology, Bloomington, Indiana
Pressey	First Grade Reading	Public School Publishing Company, Bloomington, Illinois

These three different interests, individual gain, social enjoyment and service, appear to some extent in every child. All sorts of combinations of them make the varieties of children. Is your child growing in his attitude and behavior as you wish him to grow?

He needs to be interested in his own successes. He needs to know what skills he has and what desirable skill he can get. He needs to desire progress. One of the early natural means of discovering his own skills and measuring them is by comparing and competing with others. Our civilization is so largely competitive that it seems wise in our education of little folk not to ignore it but to utilize it and to try to direct it in ways that help the individual child and the group.

It is for this reason that the group games are used, and it is for this reason that I urge you to bring other children into your home to share the joys of learning with your child. It is this sharing of the joys of learning and of success which is most truly educative. This skill will prove most valuable to him from childhood to old age—skill in the ability to succeed most while helping others to success.

Watch people to-day in any position in society and see what they do habitually. They seek their success for the most part selfishly, with little thought or care of what it may give or what it may cost another. As long as that attitude prevails in the majority of our people, we will continue to have social unrest, social problems which will not and cannot be solved. To preserve our democratic society, we must build in our children habits of individual success which are fair and generous and which include and involve the success of others. Such attitudes and such habits of success will build for our children an enduring civilization.

THE BRIDGE THAT LED TO ROME

And Fathers mixed with Commons,
Seized hatchet, bar, and crow,
And smote upon the planks above,
And loosed the props below.

But friends and foes in dumb surprise,
With parted lips and straining eyes,
Stood gazing where he sank;
And when above the surges
They saw his crest appear,
All Rome sent forth a rapturous cry.
And even the ranks of Tuscany
Could scarce forbear to cheer.

MACAULAY'S LAYS OF ANCIENT ROME

LORD MACAULAY was a great historian and a famous poet. His Lays of Ancient Rome, published in 1842, are the most celebrated of his poetical writings. They tell us stirring stories of the early days of Rome as they might have been told by a poet living between three and four hundred years before Christ. These stories are not entirely true; they are partly true, however, and we call them legends. There was a real Horatius, whose second name was Cocles, which meant that he had only one eye; but no doubt his power is exaggerated in the legend here told. Etruria was an ancient kingdom in Italy, north of Rome; Lars Porsena, king of Etruria, declared war against Rome because that city had expelled its king, whose family came from Etruria; and Sextus, who accompanied Porsena, was the eldest son of the expelled King Tarquin.

HOW HORATIUS KEPT THE BRIDGE

CONTINUED FROM 3485

LARS PORSENA
of Clusium
By the Nine Gods
he swore
That the great house
of Tarquin
Should suffer wrong no more.
By the Nine Gods he swore it,
And named a trysting day,
And bade his messengers ride forth
East and west and south and north,
To summon his array.

. . . . . .

And now hath every city
Sent up her tale of men;
The foot are fourscore thousand,
The horse are thousands ten:
Before the gates of Sutrium
Is met the great array.
A proud man was Lars Porsena
Upon the trysting day.

. . . . . .

But by the yellow Tiber
Was tumult and affright:
From all the spacious champaign
To Rome men took their flight.
A mile around the city,
The throng stopped up the ways;
A fearful sight it was to see
Through two long nights and days.

. . . . . .

To eastward and to westward
Have spread the Tuscan bands;
Nor house, nor fence, nor dovecote
In Crustumerium stands.
Verbenna down to Ostia
Hath wasted all the plain;
Astur hath stormed Janiculum,
And the stout guards are slain.

I wis (think), in all the Senate,
There was no heart so bold,
But sore it ached and fast it beat,
When that ill news was told.
Forthwith up rose the Consul,
Up rose the Fathers all;
In haste they girded up their gowns,
And hied them to the wall.

They held a council
standing
Before the River
Gate;
Short time was there,
ye well may guess,
For musing or debate.
Out spake the Consul roundly:
"The bridge must straight go
down;
For, since Janiculum is lost,
Nought else can save the town."

Just then a scout came flying,
All wild with haste and fear;
"To arms! to arms! Sir Consul:
Lars Porsena is here."
On the low hills to westward
The Consul fixed his eye,
And saw the swarthy storm of dust
Rise fast along the sky.

And nearer fast and nearer
Doth the red whirlwind come;
And louder still and still more loud,
From underneath that rolling cloud
Is heard the trumpet's war-note proud,
The trampling and the hum.
And plainly and more plainly
Now through the gloom appears,
Far to left and far to right,
In broken gleams of dark-blue light,
The long array of helmets bright,
The long array of spears.

And plainly and more plainly,
Above that glimmering line,
Now might ye see the banners
Of twelve fair cities shine;
But the banner of proud Clusium
Was highest of them all,
The terror of the Umbrian,
The terror of the Gaul.

And plainly and more plainly
Now might the burghers know,
By port and vest, by horse and crest,
Each warlike Lucumo.
There Cilnius of Arretium
On his fleet roan was seen;
And Astur of the fourfold shield,
Girt with the brand none else may wield,
Tolumnius with the belt of gold,
And dark Verbenna from the hold
By reedy Thrasymene.

Fast by the royal standard,
O'erlooking all the war,
Lars Porsena of Clusium
Sat in his ivory car.
By the right wheel rode Mamilius,
Prince of the Latian name;
And by the left false Sextus,
That wrought the deed of shame.

But when the face of Sextus
Was seen among the foes,
A yell that rent the firmament
From all the town arose.
On the house-tops was no woman
But spat towards him and hissed,
No child but screamed out curses,
And shook his little fist.

But the Consul's brow was sad,
And the Consul's speech was low,
And darkly looked he at the wall,
And darkly at the foe.
"Their van will be upon us
Before the bridge goes down;
And if they once may win the bridge,
What hope to save the town?"

Then out spake brave Horatius,
The Captain of the Gate:
"To every man upon this earth
Death cometh soon or late.
And how can man die better
Than facing fearful odds,
For the ashes of his fathers,
And the temples of his Gods?

. . . . . .

"Hew down the bridge, Sir Consul,
With all the speed ye may;
I, with two more to help me,
Will hold the foe in play.
In yon straight path a thousand
May well be stopped by three.
Now who will stand on either hand,
And keep the bridge with me?"

Then out spake Spurius Lartius;
A Ramnian proud was he:
"Lo, I will stand at thy right hand,
And keep the bridge with thee."
And out spake strong Herminius;
Of Titian blood was he:
"I will abide on thy left side,
And keep the bridge with thee."

"Horatius," quoth the Consul,
"As thou sayest, so let it be."
And straight against that great array
Forth went the dauntless Three.
For Romans in Rome's quarrel
Spared neither land nor gold,
Nor son nor wife, nor limb nor life,
In the brave days of old.

Then none was for a party,
Then all were for the State;
Then the great man helped the poor,
And the poor man loved the great,
Then lands were fairly portioned,
Then spoils were fairly sold;
The Romans were like brothers
In the brave days of old.

Now Roman is to Roman
More hateful than a foe,
And the Tribunes beard the high,
And the Fathers grind the low.
As we wax hot in faction,
In battle we wax cold:
Wherefore men fight not as they fought
In the brave days of old.

Now while the Three were tightening
Their harness on their backs
The Consul was the foremost man
To take in hand an axe:
And Fathers mixed with Commons,
Seized hatchet, bar, and crow,
And smote upon the planks above,
And loosed the props below.

Meanwhile the Tuscan army,
Right glorious to behold,
Came flashing back the noonday light,
Rank behind rank, like surges bright
Of a broad sea of gold.
Four hundred trumpets sounded
A peal of warlike glee,
As that great host, with measured tread,
And spears advanced, and ensigns spread,
Rolled slowly towards the bridge's head,
Where stood the dauntless Three.

The Three stood calm and silent,
And looked upon the foes,
And a great shout of laughter
From all the vanguard rose:
And forth three chiefs came spurring
Before that deep array;
To earth they sprang, their swords they drew,
And lifted high their shields and flew
To win the narrow way;

Aunus from green Tifernum,
Lord of the Hill of Vines;
And Seius, whose eight hundred slaves
Sicken in Ilva's mines;
And Picus, long to Clusium
Vassal in peace and war,
Who led to fight his Umbrian powers
From that grey crag where, girt with towers,
The fortress of Nequinum lowers
O'er the pale waves of Nar.

Stout Lartius hurled down Aunus
Into the stream beneath;
Herminius struck at Seius,
And clove him to the teeth;
At Picus brave Horatius
Darted one fiery thrust;
And the proud Umbrian's gilded arms
Clashed in the bloody dust.

Then Ocnus of Falerii
Rushed on the Roman Three;
And Lausulus of Urgo
The rover of the sea;
And Aruns of Volsinium,
Who slew the great wild boar,
The great wild boar that had his den
Amidst the reeds of Cosa's fen,
And wasted fields and slaughtered men
Along Albinia's shore.

Herminius smote down Aruns;
Lartius laid Ocnus low;
Right to the heart of Lausulus
Horatius sent a blow.
"Lie there," he cried, "fell pirate!
No more, aghast and pale,
From Ostia's walls the crowd shall mark
The track of thy destroying bark.
No more Campania's hinds shall fly
To woods and caverns when they spy
Thy thrice accursèd sail."

And now no sound of laughter
Was heard among the foes.
A wild and wrathful clamour
From all the vanguard rose.
Six spears' lengths from the entrance
Halted that deep array,
And for the space no man came forth
To win the narrow way.

But hark! the cry is Astur:
And lo! the ranks divide;
And the great Lord of Luna
Comes with his stately stride.
Upon his ample shoulders
Clangs loud the fourfold shield,
And in his hand he shakes the brand
Which none but he can wield.

He smiled on those bold Romans
A smile serene and high;
He eyed the flinching Tuscans,
And scorn was in his eye.
Quoth he, "The she-wolf's litter
Stand savagely at bay;
But will ye dare to follow,
If Astur clears the way?"

Then, whirling up his broadsword
With both hands to the height,
He rushed against Horatius,
And smote with all his might.
With shield and blade Horatius
Right deftly turned the blow.
The blow, though turned, came yet too nigh;
It missed his helm, but gashed his thigh;
The Tuscans raised a joyful cry
To see the red blood flow.

He reeled, and on Herminius
He leaned one breathing-space;
Then like a wild cat mad with wounds,
Sprang right at Astur's face;
Through teeth, and skull, and helmet
So fierce a thrust he sped,
The good sword stood a hand breadth out
Behind the Tuscan's head.

And the great Lord of Luna
Fell at that deadly stroke,
As falls on Mount Alvernus
A thunder smitten oak.
Far o'er the crashing forest
The giant arms he spread;
And the pale augurs, muttering low,
Gaze on the blasted head.

On Astur's throat Horatius
Right firmly pressed his heel,
And thrice and four times tugged amain,
Ere he wrenched out the steel.

"And see," he cried, "the welcome,
Fair guests, that waits you here!
What noble Lucumo comes next
To taste our Roman cheer?"

But at his haughty challenge
A sullen murmur ran,
Mingled of wrath, and shame, and dread,
Along that glittering van.
There lacked not men of prowess,
Nor men of lordly race;
For all Etruria's noblest
Were round the fatal place.

But all Etruria's noblest
Felt their hearts sink to see
On the earth the bloody corpses,
In the path the dauntless Three:
And, from the ghastly entrance
Where those bold Romans stood,
All shrank, like boys who unaware,
Ranging the woods to start a hare,
Come to the mouth of the dark lair
Where, growling low, a fierce old bear
Lies amidst bones and blood.

Was none who would be foremost
To lead such dire attack:
But those behind cried "Forward!"
And those before cried "Back!"
And backward now and forward
Wavers the deep array;
And on the tossing sea of steel,
To and fro the standards reel;
And the victorious trumpet-peal
Dies fitfully away.

Yet one man for one moment
Stood out before the crowd;
Well known was he to all the Three,
And they gave him greeting loud,
"Now welcome, welcome, Sextus!
Now welcome to thy home!
Why dost thou stay, and turn away?
Here lies the road to Rome."

Thrice looked he at the city,
Thrice looked he at the dead;
And thrice came on in fury,
And thrice turned back in dread;
And, white with fear and hatred,
Scowled at the narrow way,
Where, wallowing in the pool of blood,
The bravest Tuscans lay.

But meanwhile axe and lever
Have manfully been plied;
And now the bridge hangs tottering
Above the boiling tide.
"Come back, come back, Horatius!"
Loud cried the Fathers all.
"Back, Lartius! back, Herminius!
Back, ere the ruin fall!"

Back darted Spurius Lartius;
Herminius darted back:
And, as they passed, beneath their feet
They felt the timbers crack.
But when they turned their faces,
And on the farther shore
Saw brave Horatius stand alone,
They would have crossed once more.

But with a crash like thunder
Fell every loosened beam,
And, like a dam, the mighty wreck
Lay right athwart the stream.

And a long shout of triumph
Rose from the walls of Rome,
As to the highest turret-tops
Was splashed the yellow foam.
And, like a horse unbroken
When first he feels the rein,
The furious river struggled hard,
And tossed his tawny mane,
And burst the curb and bounded,
Rejoicing to be free,
And whirling down, in fierce career,
Battlement, and plank, and pier,
Rushed headlong to the sea.
Alone stood brave Horatius,
But constant still in mind;
Thrice thirty thousand foes before,
And the broad flood behind.
"Down with him!" cried false Sextus,
With a smile on his pale face.
"Now yield thee," cried Lars Porsena,
"Now yield thee to our grace."
Round turned he, as not deigning
Those craven ranks to see;
Nought spake he to Lars Porsena,
To Sextus nought spake he;
But he saw on Palatinus
The white porch of his home;
And he spake to the noble river
That rolls by the towers of Rome.
"Oh, Tiber! Father Tiber!
To whom the Romans pray,
A Roman's life, a Roman's arms,
Take thou in charge this day!"
So he spake, and speaking sheathed
The good sword by his side,
And with the harness on his back
Plunged headlong in the tide.
No sound of joy or sorrow
Was heard from either bank;
But friends and foes in dumb surprise,
With parted lips and straining eyes,
Stood gazing where he sank;
And when above the surges
They saw his crest appear,
All Rome sent forth a rapturous cry,
And even the ranks of Tuscany
Could scarce forbear to cheer.
But fiercely ran the current,
Swollen high by months of rain:
And fast his blood was flowing;
And he was sore in pain,
And heavy with his armour,
And spent with changing blows:
And oft they thought him sinking,
But still again he rose.

Never, I ween, did swimmer,
In such an evil case,
Struggle through such a raging flood
Safe to the landing-place;
But his limbs were borne up bravely
By the brave heart within,
And our good Father Tiber
Bore bravely up his chin.

"Curse on him!" quoth false Sextus;
"Will not the villain drown?
But for this stay, ere close of day
We should have sacked the town!"
"Heaven help him!" quoth Lars Porsena,
"And bring him safe to shore;
For such a gallant feat of arms
Was never seen before."

And now he feels the bottom,
Now on dry earth he stands;
Now round him throng the Fathers
To press his gory hands;
And now, with shouts and clapping,
And noise of weeping loud,
He enters through the River Gate,
Borne by the joyous crowd.

They gave him of the corn-land,
That was of public right,
As much as two strong oxen
Could plough from morn till night;
And they made a molten image,
And set it up on high,
And there it stands unto this day
To witness if I lie.

It stands in the Comitium,
Plain for all folk to see;
Horatius in his harness,
Halting upon one knee:
And underneath is written,
In letters all of gold,
How valiantly he kept the bridge
In the brave days of old.

. . . . . .

When the goodman mends his armour,
And trims his helmet's plume;
When the goodwife's shuttle merrily
Goes flashing through the loom;
With weeping and with laughter
Still is the story told,
How well Horatius kept the bridge
In the brave days of old.

FARRAGUT

This stirring little poem by William T. Meredith is a description of the naval battle fought in Mobile Harbor in 1864 between the Federal and Confederate forces. Admiral Farragut was in command of the Federal fleet.

GRAY-HAIRED old Farragut,
Bold heart unbroke,
Daring old Farragut,
Thunderbolt stroke,
Watches the hoary mist
Rise from the bay,
While his flag, glory-kissed,
Waits for young day.

See! 'neath Fort Morgan's wall
Black looms a fleet.
Hark! deck and rampart call,
Rolls the drum-beat.
Lads! buoy your anchor-chains
While the steam hums.
Men! to the battlement,
Farragut comes.

Now! as the hurricane
Hurtles in wrath
Squadrons of clouds amain
Back from its path,
Back to the parapet,
To the guns' lips,
Thunderbolt Farragut
Hurls the black ships.

Out through the battle's roar
Clear the lad sings,
"By the mark fathoms four,"
While his lead swings.
Steady the wheelmen five,
"Nor' by East keep her,"
"Steady," but two alive;
How the shells sweep her!

High 'neath the spars that sway
'Bove crimson decks,
Over the flames that play
Round the torn wrecks,
Over the dying lips
Framed for a cheer,
Farragut scans his ships,
Guides the fleet clear.

On by heights battle-ploughed,
While the spars quiver;
Onward still flames the cloud
Where the hulks shiver.
See, yon fort's star is set,
Storm and fire past,
Cheer him, lads—Farragut,
Victor at last.

There dares he for duty,
Duty 'bove fame,
Like summer storms' beauty,
Fame fickle and vain.
Plighted his true heart's troth
And bold endeavour
To Country, and South and North
One flag ever.

O! while Atlantic's West
Knows mist or gale,
While the Gulf's towering crest
Tops a green vale,
Nations shall name thee yet
Old Heart unbroke,
Daring old Farragut,
Thunderbolt stroke!

THE BLUE AND THE GRAY

These well-known lines by Francis Miles Finch were inspired by a visit to the National Cemetery at Arlington, where the soldier dead of the Northern and Southern armies lie side by side. Death and time, they seem to say, heal all discords, and in paying honor to the dead, enmity is forgotten. Notice with what skill the poet has used the force of contrast in each verse: "the robings of glory, the gloom of defeat"; "Under the roses, the Blue," "Under the lilies, the Gray." Yet both Blue and Gray are under the sod and dew, and sun and rain fall on both alike.

BY the flow of the inland river,
Whence the fleets of iron have fled,
Where the blades of the grave-grass quiver,
Asleep are the ranks of the dead:
Under the sod and the dew,
Waiting the judgment-day;
Under the one, the Blue,
Under the other, the Gray.

These in the robings of glory,
Those in the gloom of defeat,
All with the battle-blood gory,
In the dusk of eternity meet:
Under the sod and the dew,
Waiting the judgment-day;
Under the laurel, the Blue,
Under the willow, the Gray.

From the silence of sorrowful hours
The desolate mourners go,
Lovingly laden with flowers
Alike for the friend and the foe:
Under the sod and the dew,
Waiting the judgment-day;
Under the roses, the Blue,
Under the lilies, the Gray.

So with an equal splendour,
The morning sun-rays fall,
With a touch impartially tender,
On the blossoms blooming for all:
Under the sod and the dew,
Waiting the judgment-day;
Broidered with gold, the Blue,
Mellowed with gold, the Gray.

So, when the summer calleth,
On forest and field of grain,
With an equal murmur falleth
The cooling drip of the rain:
Under the sod and the dew,
Waiting the judgment-day;
Wet with the rain, the Blue,
Wet with the rain, the Gray.

Sadly, but not with upbraiding,
The generous deed was done,
In the storm of the years that are fading
No braver battle was won:
Under the sod and the dew,
Waiting the judgment-day;
Under the blossoms, the Blue,
Under the garlands, the Gray.

No more shall the war cry sever,
Or the winding rivers be red;
They banish our anger for ever
When they laurel the graves of our dead!
Under the sod and the dew,
Waiting the judgment-day;
Love and tears for the Blue,
Tears and love for the Gray.

A VISION

Henry Vaughan, who had this great vision of Time and Eternity, was a Welsh poet who died in 1695.

I SAW Eternity the other night,
Like a great ring of pure and endless light,
All calm, as it was bright:
And round beneath it, Time in hours, days, years,
Driven by the spheres,
Like a vast shadow moved; in which the World
And all her train were hurled.

HOW MANY TIMES?

Thomas Lovell Beddoes was a writer of the first half of the nineteenth century, which was a time of sentiment in song. The two comparisons worked up into these verses are what critics call "conceits." Wishing to say how much he loves his lady, the poet compares his thoughts of her with all the thoughts of all the people in all the nights and days of a year, or all the drops that glisten in the starlight. These comparisons are built up with a fanciful care, but they lack the simple outburst of feeling of the true song, as given in Burns's popular verse, "O, my luve's like a red, red rose!"

HOW many times do I love thee, dear?
Tell me how many thoughts there be
In the atmosphere
Of a new-fallen year,
Whose white and sable hours appear
The latest flake of Eternity;
So many times do I love thee, dear.

How many times do I love, again?
Tell me how many beads there are
In a silver chain
Of the evening rain,
Unravell'd from the tumbling main,
And threading the eye of a yellow star;
So many times do I love, again.

THE BUTTERFLY'S FUNERAL

This poem, as the first lines suggest, is a sequel to the Butterfly's Ball and Grasshopper's Feast, given on page 1008. The poem is filled with pretty fancies about small creatures which every boy and girl should know. It tells of a comradeship between the lower animals, and wherever they do not prey on each other there is such a comradeship.

OH ye! who so lately were blithesome and gay,
At the Butterfly's banquet carousing away;
Your feasts and your revels of pleasure are fled,
For the chief of the banquet, the Butterfly's dead!

No longer the Flies and the Emmets advance,
To join with their friends in the Grasshopper's dance,
For see his fine form o'er the favourite bend,
And the Grasshopper mourns for the loss of his friend.

And hark to the funeral dirge of the Bee,
And the Beetle, who follows as solemn as he!
And see, where so mournful the green rushes wave,
The Mole is preparing the Butterfly's grave.

The Dormouse attended, but cold and forlorn,
And the Gnat slowly winded his shrill little horn;
And the Moth, being grieved at the loss of a sister,
Bent over her body and silently kissed her.

The corpse was embalmed at the set of the sun,
And enclosed in a case which the Silkworm had spun;
By the help of the Hornet the coffin was laid
On a bier out of myrtle and jessamine made.

In weepers and scarfs came the Butterflies all,
And six of their number supported the pall;
And the Spider came there in his mourning so black,
But the fire of the glow-worm soon frightened him back.

The Grub left his nut-shell to join the sad throng,
And slowly led with him the Bookworm along,
Who wept for his neighbour's unfortunate doom,
And wrote these few lines, to be placed on his tomb:

Epitaph

At this solemn spot, where the green rushes wave,
In sadness we bent o'er the Butterfly's grave:
'Twas here the last tribute to beauty we paid,
As we wept o'er the mound where her ashes are laid.

And here shall the daisy and violet blow,
And the lily discover her bosom of snow;
While under the leaves, in the evenings of spring,
Still mourning his friend, shall the Grasshopper sing.

A MILLION LITTLE DIAMONDS

A MILLION little diamonds
Twinkled on the trees;
And all the little maidens said,
"A jewel, if you please!"

But while they held their hands outstretched
To catch the diamonds gay,
A million little sunbeams came
And stole them all away.

A SUMMER'S DAY

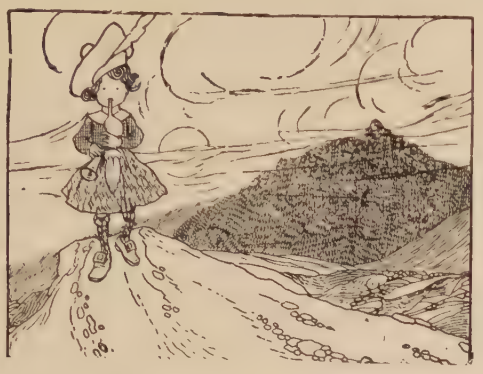
The Scottish writer of these verses, Alexander Hume, lived from 1560 to 1609, and so was a contemporary of Shakespeare. He was the first poet to describe outdoor life with simple feeling. These verses are from the best poem of its kind that had then appeared in the English tongue. *Simples* is an old word for simple remedies; *callor* means cool.

THE time so tranquil is and still,
That nowhere shall ye find,
Save on a high and barren hill,
An air of peeping wind.

All trees and simples, great and small,
That balmy leaf do bear,
Than they were painted on a wall,
No more they move or steir.

The rivers fresh, the callor streams,
O'er rocks do softly rin,
The water clear like crystal seems,
And makes a pleasant din.

TOM, TOM THE PIPER'S SON



TOM he was the piper's son,
He learn'd to play when he was young,
But the only tune that he could play
Was, "Over the hills and far away."

Now Tom with his pipe made such noise,
That he pleased both the girls and the boys,
And they stopp'd to hear him play,
"Over the hills and far away."

Tom with his pipe did play with such skill,
That those who heard him could never keep still;
Whenever they heard they began for to dance,
Even pigs on their hind legs would after him prance.

As Dolly was milking her cow one day,
Tom took out his pipe and began for to play;
So Dolly and the cow danced "The Cheshire round,"
Till the pail was broke and the milk ran on the ground.

He met old Dame Trot with a basket of eggs.

He used his pipe and she used her legs;
She danced about till the eggs were all broke,
She began for to fret, but he laughed at the joke.

He saw a cross fellow was beating an ass,
Heavy laden with pots, pans, dishes, and glass;

He took out his pipe and played them a tune,
And the jackass's load was lightened full soon.

SOLOMON GRUNDY,
Born on a Monday,
Christened on Tuesday,
Married on Wednesday,
Took ill on Thursday,
Worse on Friday,
Died on Saturday,
Buried on Sunday,
This is the end of
Solomon Grundy.

PUSSY CAT, pussy cat, where have you been?
I've been to London to look at the Queen.

Pussy cat, pussy cat, what did you there?
I frightened a little mouse under the chair.

LITTLE VERSES FOR VERY LITTLE PEOPLE

JANUARY brings the snow,
Makes our feet and fingers glow.

FEBRUARY brings the rain,
Thaws the frozen lake again.

MARCH brings breezes loud and shrill,
Stirs the dancing daffodil.

APRIL brings the primrose sweet,
Scatters daisies at our feet.

MAY brings flocks of pretty lambs
Skipping by their fleecy dams.

JUNE brings tulips, lilies, roses,
Fills the children's hands with posies.

HOT July brings cooling showers,
Apricots and gillyflowers.

AUGUST brings the sheaves of corn,
Then the harvest home is borne.

WARM September brings the fruit,
Sportsmen then begin to shoot.

FRESH October brings the pheasant,
Then to gather nuts is pleasant.

DULL November brings the blast,
Then the leaves are whirling fast.

CHILL December brings the sleet,
Blazing fire and Christmas treat.

The grass waves in the wind.

THE SPLENDOR OF THE GRASS

CONTINUED FROM 3526

THE great Grass Family includes nearly five thousand different species. Some grow to be hardly more than an inch in height, while some of the bamboos (which are true grasses) may reach a height of a hundred feet or more.

Grasses are to be found in the tropics, and they reach both north and south toward the region of perpetual snows. Some of them grow only in dry and hot portions of the earth, while others like to have their feet in water all the time.

Upon them our life depends. The bread we eat, whether it be made from wheat, oats, rye or corn, comes from a grass. Rice is a grass, and so is sugar-cane. The meat we eat is made principally from grass, no matter what animal furnishes it. The horses which pull the plow or draw the loads depend upon grass or its seeds for their food. So you see when the Hebrew prophet of old said that "all flesh is grass" he was speaking the literal truth, though he was really comparing the short life of man to the grass which springs up, lives for a short time and then withers away.

There is no part of the world in which there are not many species of grasses. Some particular kinds are widely scattered over the earth, as, for example, the common reed grass. Some are confined to a narrow area, such as high mountain-tops, or certain parts of the tropics. In the temperate regions man finds grasses wherever he goes, and others have followed in his footsteps.

Though there are several hundred grasses native to North America, some of the commonest kinds now found here were brought from other continents, sometimes intentionally, but very often accidentally.

The seeds of many species are very small. Dozens of them made the trip across the ocean in the little patches of soil which had stuck to the spade a colonist brought with him. Even the bit of clay which clung to his working shoes when he was taking his last walk through the fields in his old home might serve to transport the seeds of several species of grass to the new land.

The hay carried on shipboard to feed the animals which the early colonists soon brought over was often of species not found here. When the ship was cleaned, or the surplus brought on shore, some of the seeds may have reached favorable ground. Some grasses have seeds with sharp hooks that cling to clothing and came across in this way. If the conditions of soil and temperature were suitable, these

grasses flourished, and now we never think of them as being immigrants.

For example, we are so familiar with orchard grass, timothy, rye-grass and meadow foxtail that we take it for granted that they have always been here. On the contrary, all of these we have named and many others came from Europe. Just as men and women born in Europe become citizens of our country by naturalization, so we may say that these grasses have been naturalized, and are now a part of our flora, as we call our plant life.

The sugar-cane and the sorghums were brought from the Old World. Probably the original home of the sugar-cane was in Asia, and of the sorghums in Africa. Fields of these are beautiful, but there are few sights more attractive than a great field of our own corn, which belongs to America.

How grass makes the world more beautiful

So much for the usefulness of grass. Let us now speak of the beauty of the grass. What a difference in the appearance of the world the grass makes. Have you ever seen a house just completed standing on a bare lot? How cheerless and unkempt it seemed! But given time, the grass comes and covers the lot with a mantle of green. What was only a house begins to look like a home. Perhaps the grasses which appear are not the most beautiful. Very likely the soil is poor, and the surface uneven, but at least the ugliness is hidden.

What a joy it is to rest the eyes by looking at a well-kept lawn where the grass forms a living carpet! What a satisfaction it is to strike out over the hills! The springy turf is under our feet instead of hard pavements. The rolling hills, softened by the green covering, rise before us. When the grass is high the wind ripples over the fields, and you stop to see the progress of the wave.

The tiny flowers of some grasses are exquisite

Most of the grass flowers are small, and the careless hardly know that they exist. We have already shown you some magnificent pictures in color on pages 3521 to 3524, and you will agree that they are beautiful. There are dozens of others which are just as attractive if you will take the trouble to look. A simple magnifying glass will be a great help in studying some of the tiny flowers.

We speak of the grass as green, and yet many of the grasses show other colors. Purples, blues, yellows, reds, oranges are also to be found in profusion. In fact, some of the grasses are hardly green at all except when they are very young. As they mature other colors appear on blade, stalk and flower. They combine to make every clump a thing of beauty if we have the seeing eye.

The delicate odors of some of the grasses

The senses of touch and sight are not the only ones gratified by the grass. Unless our noses have been spoiled by strong odors, a field of grass may be like a flower garden if we will only come down to the earth, and lie among the fragrance. Some of the tiny flowers have the most exquisite smell. In others the blades themselves are filled with the delicate perfumes, and a little pressure will bring them out. You have seen baskets made of some of these sweet grasses.

When the hay is cut and the grass is lying on the ground, giving up its moisture, the odor is sweet beyond words. No wonder the perfumer tries to capture the secret and labels it "new-mown hay," but one who really knows the hay-fields will not be deceived. This is a scent which the chemist may imitate, but there is something in it that he cannot catch. The writer never feels so much at peace with the world as in the hay-field when the sun is shining, his ears are soothed by the drowsy hum of bees, and the waves of scent from the drying grass are all around.

We are showing you pictures of thirty-two important grasses. Some are valuable for hay, and you may see them either alone or mixed in the fields the farmer cuts. You will recognize the sweet vernal grass by smell if not by sight. It is the principal grass which gives the odor to the hay drying in the fields. It is found in nearly every field of mixed grass.

Some of these grasses are not of much use for hay, but they grow on the sandy shores, and prevent the sand from shifting. This is very important, for the wind and the sand may bury cultivated fields or kill trees. The fibrous roots of these grasses hold the sand in position and prevent it from moving so rapidly. Others are valued for their beauty. They make the world a more pleasant place.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 3721.

THE MOST FAMILIAR WILD GRASSES

FIBROUS-ROOTED WHEAT—COUCH GRASS
Growing in woods, in July.

CREEPING WHEAT—COUCH GRASS
Growing in waste places, in June and July.

Though we may find couch grass in the woods, it is no use to look for it in the same place year after year, for, if left to itself, it soon dies down. Sometimes it is called "spear grass." The picture shows why.

PERENNIAL RYE GRASS

ORCHARD GRASS

Growing in meadows and pastures, from June onward.

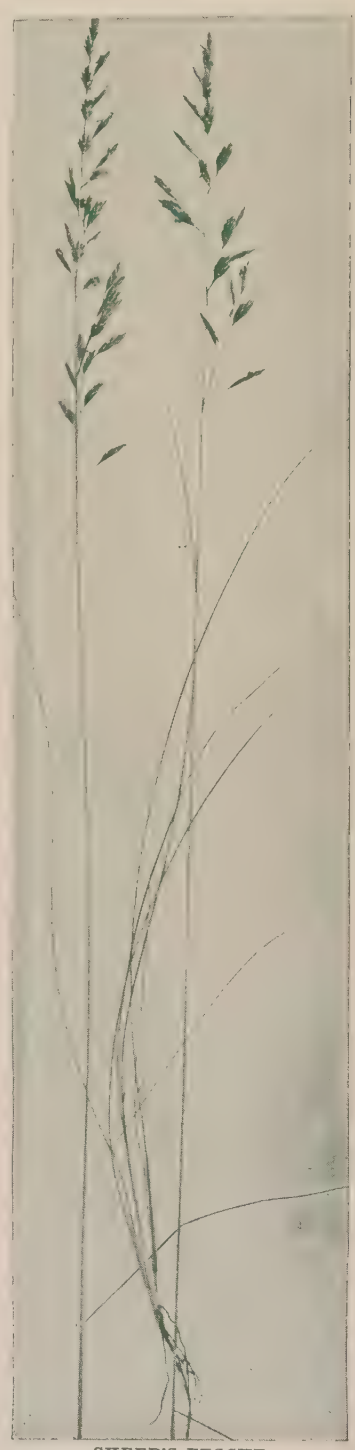
Rye grass is frequently to be met with in this country. It was the first grass to be gathered and cultivated in England. Orchard grass is very tall-growing. That is why hares and rabbits are so fond of it, as it is high enough for them to hide in and escape detection. Both of these grasses were brought from Europe.

MARSH BENT GRASS, OR RED TOP
Growing in damp places, from July onward.

BROWN BENT GRASS
Found in meadows, July.

Bent grass is a very hardy grass—that is to say, it is difficult to kill. For this reason we find that the grass which grows by the roadside, or where there is much traffic, is largely bent grass. It is also a useful grass to plant on sandy hill slopes where otherwise water is likely to wash the earth away.

COMMON QUAKING GRASS
Found on downs and poor pastures, in June and July.



SHEEP'S FESCUE
Found on downs and moors, in June.

Quaking grass has this curious name because it quakes, or trembles, in the slightest breath of air, when all other grasses are standing still. As we may judge by its name, sheep's fescue is a favorite with sheep. It grows in rough places which would otherwise afford no food for flocks. Fescue means "stalk."

COMMON REED
Growing by ponds and marshes, in September.

TIMOTHY OR CATTAIL GRASS
Growing in meadows, July and August.

It is easy to tell reed grass from others, because it is much later in flowering than the other waterside-loving grasses. When we look at timothy we can see that there is no other grass quite like it. Though it is a native of England, it was first cultivated in the United States and then reintroduced to Europe.

FLOATING FOXTAIL
Growing in marshy places, from June.

COMMON SEA-REED, OR BEACH GRASS
Growing in loose sand by the sea about July.

Floating foxtail is a kind of brother of meadow foxtail; but it is not useful, merely curious, because it grows wild in such very wet places. The sea-reed is very useful because it prevents the storms from washing away the sands in which it grows and thus prevents the sea from encroaching upon the land.

YELLOW OAT GRASS

Growing in pastures and meadows, in June and July.

CRESTED DOG'S-TAIL

Growing in meadows, from June onward.

Yellow oat grass is so called on account of its bright yellow flowers. It is cultivated in France, but rarely found in America. It is a great favorite with sheep and cattle. Crested dog's-tail is nearly always found where chalk abounds. That is why it grows in abundance, for example, in England, on the downs of Kent.

SOFT BROME
Growing in meadows and pastures, from May to August.

SEA-LYME GRASS
Growing by the sea, in July.

Soft brome is a very greedy grass. That is to say, it devours all the nourishment there is in the soil, and leaves any other grasses near to starve and die. Sea-lyme grass is very much like sea-reed, shown two pages back. Even grown-up people, who should know better, frequently mistake one for the other.

SLENDER FALSE BROME
Grows in shady places, in July and August.

CREEPING SOFT OR VELVET GRASS
Growing in woods from July onward.

Some people say that false brome does not really belong to the brome family at all, and that is why they call it "false." It is really, however, entitled to a place among the bromes. The roots of creeping soft grass spread or creep underground very quickly, and this gives it its name. Cattle do not care for this grass.

PURPLE MOLINIA
Growing on wet lands, in August.

SWEET-SCENTED VERNAL GRASS
Growing in meadows and pastures, from May.

Purple molinia gets its name from the dull purple color of its flowers. Sweet vernal is a lovely grass with yellow flowers. That delightful scent of new-mown hay is due in a great measure to the fragrance of this grass. The sweeter the scent of the hay, the greater the proportion of sweet vernal grass in its composition.

WALL BARLEY
Grows in waste places, from July onward.

BARREN BROME
Growing in waste places, in June.

We can sometimes find wall barley in country lanes huddling up at the foot of walls, but not very often growing out boldly in the fields. Its bristly spikes are quite sharp. Barren brome is so called because it grows in barren places where few other things will thrive. It has been brought here from Europe.

WOOD MEADOW GRASS
Growing in woods, in July.

ANNUAL MEADOW GRASS
Grows almost anywhere from March onward.

Wood meadow grass is a valuable one from the farmer's point of view, as it grows so quickly after the cattle have nibbled it down. Annual meadow grass is the first grass to appear in fresh ground, such as when a railway embankment has been cut. The seed is carried by the wind, and quickly germinates.

MEADOW FOXTAIL
Growing in meadows, from May.

WILD OAT
Growing in cultivated fields, in July and August.

In some parts of the old country foxtail used to be called "guinea grass," because English children, and sometimes grown-ups, too, used to collect the heads and sell them for a guinea a bushel. From the wild oats have sprung the cultivated sorts with which oatmeal and other articles of food are now manufactured.

TALL FESCUE
Growing in moist meadows, in July and August.

SMOOTH MEADOW GRASS
Growing in meadows, June and July.

Tall fescue grass does not make very good food for cattle, but it is useful in another way, for it grows so tall that it can be cut down and used as a litter, or bed, for animals. Smooth meadow grass is one of the lime-loving grasses. Hence it is to be found often in company with crested dog's-tail, shown on page 3655.

MAT GRASS
Grows on beaches, June.

TUFTED HAIR GRASS
Growing in ditches and wet places, in July.

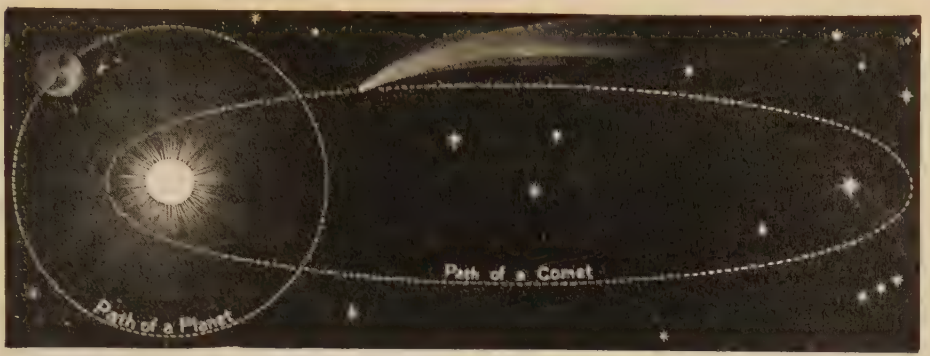
Mat grass, sometimes called marram, meaning "sea-straw," is found on sandy "dunes" or "denes" by the seashore. In Northern Africa, where it grows taller than elsewhere, it is cut and used for the manufacture of paper. Tufted hair grass is generally to be found in the company of floating foxtail, shown on page 3654.

MEADOW SOFT GRASS
Growing in meadows, from June onward.

RED CANARY GRASS
Growing by streams and ponds, in July.

Meadow soft grass has smaller seeds than the majority of grasses. So small are they that, by weighing and counting a small number, it is calculated that it would take nearly two millions of them to weigh a pound. Red canary grass grows in wet places. It is closely related to the ribbon-grass of the garden.

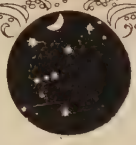
The photographs on these pages are by Henry Irving.



The paths of the earth and of a comet round the sun.

FRAGMENTS OF THE SOLAR SYSTEM

CONTINUED FROM 3544



DUST there is in the air, we know. At the top of the highest mountains ever climbed there are three thousand specks of dust in every cubic inch of air, and in the highest clouds dust floats. But does it float in the great emptiness between the sun and the planets? Does it collect in the greater gulfs of space between the stars?

It does; but this is dust of such a fineness that one almost despairs of conveying an idea of it. You may think of a fog as dust of a kind, but a fog will cut down the light of a lamp to one-half in a few yards; the dust-fog in outer space is so thin, the specks are so small, so far apart, that a thousand billion miles of such a fog would cut off only part of a distant star's brightness. How begotten, how created, none can tell; but some men of science have lately thought that the light from the stars can itself create the particles of this dust.

That is the finest kind of dust that has been imagined. It may be that some of it comes into the solar system as the sun, with its train of planets, makes its majestic way through space; it may also be that the sun leaves dust behind on that immeasurable journey. Remember that a speck of dust, like every other material thing, is subject to that law of attraction we call gravity. A speck of dust is pulled down to the earth, though the winds may bear it up. If the speck were placed within a measurable distance of the sun, the sun would pull it in. But there is something else the sun is doing besides pulling things to it. It is pouring out energy, radiating light. Now only a two thousand millionth of this great outrush of energy falls on the earth, but even so the pressure of the sun's light on the earth is equal to 75,000 tons.

The sun is pushing the earth away with that force, though the effect is swamped in the billions of tons with which it is pulling the earth to itself by the force of gravitation. But suppose the pressure of the sun's light is falling on something very much smaller than the earth, a speck of dust smaller than we can imagine. On dust of that size and kind the light pressure may be greater than the gravitational pull.

A particle of that kind might have almost any kind of career in space. Anything might happen to it. Such a particle as that would be a huge body compared with the particles of that dust-fog in space which we have imagined the sun catching up to or leaving behind. But in the solar system such dust specks, which are something like the size of molecules of matter, have a peculiar interest, for they are the stuff that a comet's tail is made of.

THE TIGHT HOLD OF THE SUN ON ITS WANDERING CHILDREN THE COMETS

We have begun our story of the comet at its tail because comets are by so much the smallest members of the sun's great family that if it were not for their tails, they would be hard to see at all. There are some four hundred of them whose paths we know, belonging as certainly to the sun as any planet or planetoid. When they come near to it, it turns a fierce eye on them and makes them shine; and when they leave it to go out again to the uttermost parts of its realm, they keep the glow of their reception for a long time on their backward journey. Small as they are, they obey laws like those which rule the planets. The planets go round the sun in paths which, if we drew them on this page, would look like circles, but which are really ellipses.

Suppose we were to turn the rays of a magic lantern on a sheet held close to it. If the lantern is held quite square, a circle of light appears on the sheet. If the lantern is put a trifle askew, the circle turns into an ellipse, and the more askew the lantern, the longer and flatter the ellipse. If the lantern is turned askew enough, the sides of the ellipse will go right off the sheet, however close the lamp is held, and then the lighted space has sides like the sides of a parabola, which never join again. If we keep these figures in mind, we can form an idea of the paths of some of the comets which are so flat and go so far out that it seems sometimes that they can never come back again. But they will, for, though some astronomers used to think that perhaps a comet now and again would come into the solar system from outer space, it is almost certain that none that are known has ever done so; for if it were otherwise, we should have to believe that more comets caught up to the sun than the sun passed on its journey, which is like supposing that a snail could catch an express train. So we may take it that all the comets belong to the sun; that, however far they go out adventuring, the sun keeps a tight hand on them.

The Germans used to speak of their setting out to see the world as their "wander-year." The comets have their wander-years, though, instead of lasting 365 days, as the year of the earth does, or over 164 of our years, as Neptune's does, their years may be hundreds of times greater than ours. Halley's Comet, which was last seen in 1910 and has a history of recorded appearances going back as far as 240 B.C., will be back in 1985, and some of us will live to see it. But nobody living will ever again see the Comet of 1911, which had a tail 15 millions of miles across, for it will not be back for another 2,900 years; and there are others whose journey takes longer.

THE INVISIBLE ARM OF A PLANET THAT SOMETIMES ARRESTS A COMET

What a strange and wonderful journey is theirs! Imagine them far, far away, beyond the planet Neptune, where the sun's rays hardly light up the darkness. Sometimes they jog along at only ten feet a second, but quicken up as they turn the sign-post to come back again to the sun. They slow up as their other parent—the sign-post planet, as we call it—holds them back; and then once again quicken as they get well away on the homeward stretch.

But it will not all be plain sailing for them. Sometimes a giant planet, Saturn or Jupiter, will stretch out an invisible arm to clutch at them, causing them to check or swerve violently on their path.

Jupiter has captured a comet in our own time—Comet Brooks, 1889—and changed its path altogether. Comet Brooks was handled so violently that it broke in half. Saturn was suspected of having annexed another and converted it into a satellite, but this is not probable. Thus the comet may encounter strange vicissitudes, and many, in fact, must do so, because the majority keep fairly close to the plane of the rings which the solar family as a whole describes.

THE GLORY OF A COMET AS IT RUSHES PAST THE SUN

But at last let us suppose that all danger-points have been passed, and the comet approaches the sun. All appearance of leisure is thrown off as it approaches the family mansion. It runs, it gallops, it flies on faster and faster and faster yet—till it is rushing round the sun in a delirium of speed which can rise to 212 miles a second. As it approaches the sun it puts forth all its hidden glories. Like a peacock of the skies it flaunts its tail to honor the sun. It may be a little tail, for some of the comets are very modest bodies; it may be a splendid apparition, like the corona of the sun. When it is very close, however, it is difficult to see.

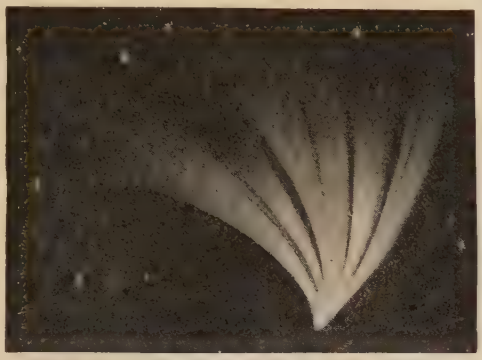
Something like a corona is the great distinguishing and mysterious quality of the comet. The sun, alone among all its family of planets, possesses a corona, though we see it only at eclipses. Then it stretches out its long rod-like rays as if to touch its dependents. Jupiter, the hottest of the planets, has no such thing, nor has ringed Saturn. But these wandering messengers called comets fling out something that is like a corona when they come near the sun, something a poet has called "the burnished livery of the burning sun," as if to prove that in spite of their insignificance they, too, belong to the royal house.

Some of them have flung out more than one tail—the comet of 1744 had several tails—some had tails on which the sun would appear no larger than the "eye" of a peacock's feather, so wide were they; and some would reach farther than the sun's corona. The comet of 1843, the finest in history, is supposed to have had a tail 150 million miles long. Had it stretched from the sun it could have enveloped the earth and reached beyond the planet Mars.

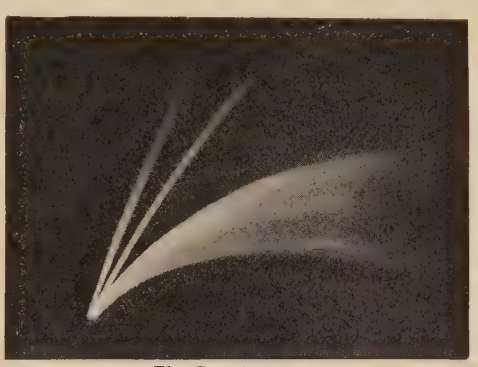
Then the comet turns to go back; its tail turns over and shortens, and as the comet gets farther and farther away the tail is tucked between its legs, and is seen no more till it comes back. It may be back in a few years, or in a few centuries. Some comets go no farther away than Saturn before making another return to the sun. Some go to Jupiter—thirty are known to do so—and it is supposed that Jupiter may have captured some of them.

By capturing them is not meant that the giant planet took them away from the sun, but that, whereas at some unknown time they went far out to the nethermost planets, they now have to turn round Jupiter as their farthest mark. By way of contrast Saturn has taken only two. The long-period comets still go on to Uranus, or Neptune, or beyond. Neptune has six certainly, of which Halley's Comet is one.

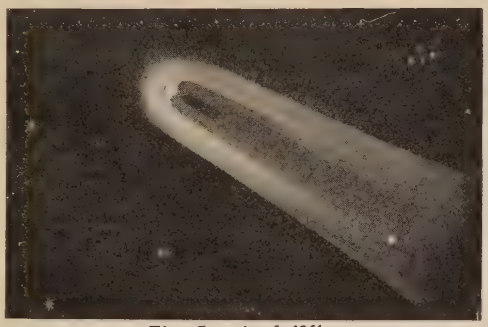
We cannot be more sure, because they take such a long time to go and return that only a Methuselah could live long enough to identify them. Some perhaps sail out to the uncharted seas beyond Nep-



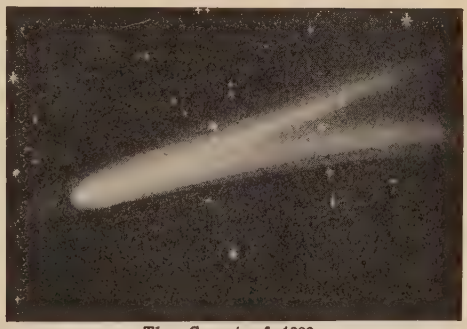
The Comet of 1744.



The Comet of 1858.



The Comet of 1861.



The Comet of 1882.

The brightest and biggest comets can be seen without the aid of a telescope, and these pictures of four important comets show us that they vary greatly in shape.

tune, where the Unknown Planet is to be sought. The long-period comets are usually those which are the brighter and more resplendent. It is suspected that the glorification of the home-coming to the sun, and the mighty display of the tail, are purchased at the loss of some of the comet's substance. Those that come home least often preserve their inheritance longest.

Some of the comets appear to belong to families of their own—to be, as one might say, cousins. By that we mean that they move in the same way, though not in the same paths. There was a favorite trio, all very bright, which came in 1843, 1880 and 1882. Each was a comet which had a very long journey, which came very near to the sun in going round it and went round in the wrong way—opposite to the hands of a clock. So we might expect that these three had a common ancestor.

What could have been the common ancestor of all the comets? We naturally suspect that they must have had one, because they are so like one another and so different from everything else that goes round the sun. It is supposed that perhaps when the great curling nebula that formed itself at last into the sun and all the planets was beginning to cool and become solid, there was a fragment of the same sort of stuff "left over," or even "not belonging" at all, but nevertheless traveling the same way as the sun. By and by bits of this fragment would be dragged toward the sun, and at first they would seem to come from nowhere and to nowhere return. But in course of ages their movements would be timed and regulated, their paths would be changed from parabolas to ellipses; they would, in short, be captured by the solar system.

How far the comet has changed from this original stuff of which worlds were made is not easy to pronounce. Comets are not so light as they were supposed to be when someone spoke of the possibility of packing them into a traveling-bag. Their tails are indeed light; but the bodies of the comets are of respectable weight. It is believed that the thing to which they can most closely be compared is the substance of the rings of tiny moons that fly round the planet Saturn. They are, then, perhaps, so far as the head of the comet goes, collections of stones widely separated from one another and shining by their own light as they jostle together. We shall think of them for a moment as meteoric stones. The combined mass of any comet's stones can certainly never amount to one-hundred-thousandth of the mass of the earth, and is probably a good deal less than that. Even so, they may weigh millions of tons. We have learned that in the substance of

Halley's Comet as it appeared in 1910.

The Comet that appeared in 1908.

A GREAT COMET PASSES BY

Our scientific artist here imagines what the head of a large comet would look like followed by a tail millions of miles long, if we could see it at close quarters.

comets are such metals as iron, sodium, magnesium, and certain gases. Not unnaturally, astronomers, after these facts had been shown by the spectroscope, surmised that the huge tails of comets were trailing volumes of gases thrown out by the collisions in the nucleus and pushed away from the comet, as it approached the sun, by the sun's electric repulsion.

As three separate tails could sometimes be discerned—one flying straight back from the comet, one curving over a little like a scimitar, and the third curving still more like a claw—it was supposed that the electric repulsion sorted out the gases and pushed them back more or less powerfully. Thus, the gas tail pushed back nearly straight would be hydrogen; the tail next in order would be the carbon gases; the stubby claw-like tail would be composed of metallic gases.

We have mentioned this idea, not to refute it—though it is now abandoned—but because it illustrates what to all appearance happens to the tail of a comet, which seldom appears to be all made up of one kind of matter.

Humboldt and a friend watching a display of meteors in 1799.

But we now know that the tail cannot be gas, because gas would be too heavy, too dense. The tail is made of something ever so much thinner and lighter than any gas. If we take the best of air-pumps and try to produce a vacuum, there are always some molecules of gas left after every effort. The tail of a comet is even thinner than the vacuum produced by an air-pump. But it is most likely made up of a cloud of particles, like molecules, but very far apart, which are repelled by the sun's light. They are, despite their smallness, not of the same weight, and therefore are pushed back in different degrees. Though they make such a show, being lighted up by the sun's electric forces—as a Crookes tube is lighted up when electricity passes through it—their total weight is so small that it is hard to reckon.

We may, however, make a calculation from what was observed about the tail of Halley's Comet when last it came in sight. When its tail was between the earth and the sun it was entirely invisible. The density was only a minute fraction of hydrogen gas. The earth, therefore, could not possibly be poisoned by any emanation from a comet's tail, even if a comet struck us, which can happen only about once in fifteen million years—though a comet in 1921, called Pons Winnecke's Comet, came very near to the earth. The earth did, in fact, pass through the tail of Halley's Comet.

But if the tail is very thin, there is plenty of it to spare. The weight of all the particles that would be caught by the earth, on all its lands and all its seas, would at most amount in a day to 250 tons. Still, we can now be sure that a great comet, when approaching the sun, loses a good deal of substance, which never returns but just becomes the wandering dust of space.

For some reason that cannot be explained there have been few bright comets visible to the naked eye since the twentieth century began, though there are always several comets picked up each year by the telescopes. Halley's was a disappointment: its appearance fell far short

of its two-thousand-years reputation; it had perhaps visited the sun too often. Only one bright comet which all could see easily has visited the skies since the great one of 1882, and this visitor showed to advantage only to those who looked at it from the southern hemisphere. Yet the number of bright comets which visit us is between twenty and thirty in a hundred years, so that perhaps the future will see a new outburst of them.

But if there have been few great ones, there have been some very interesting ones, because they have told us a great deal about the life of comets. There is Encke's Comet, for example, which has the shortest journey known, for it takes only three years over its journey to Jupiter and is so unpunctual that it was thought to be slowing down preparatory to falling into the sun. There is Moorhouse's Comet, the particles of whose tail in 1908 were shown to be flying at 66,000 miles a second—very nearly the speed of some of the particles of radium. There is Comet Brooks (1889), which used to have a twenty-seven-year trip, but now, having gone too near giant Jupiter, was captured and torn in half by the ogre, the two parts being slowly separated from one another and sent on a trip reduced to seven years.

Biela's Comet has had a still more desperate career. When it was observed in 1826 it had a bright nucleus, and developed in due time a sort of veil round its nucleus and a proper tail. But twenty years later, when it reappeared for the third time, the nucleus parted; a little less than seven years later it came back with the two halves farther apart—and then it was lost. But in 1872, when the earth passed again the track of the lost comet, instead of Biela there appeared a fine display of meteors. Possibly they were all that was left of Biela.

A massive meteorite found by Commander Peary in Greenland.

Reproduced from Northward Over the Great Ice, by Robert E. Peary. Reprinted by courtesy of the publishers, Frederick A. Stokes Company.

That brings us to the second part of our story—the meteors. What are they? Some of them we should suspect of being fragments of broken-up comets which come hurtling into the atmosphere of the earth. There they come into contact

with the gases and are set on fire by friction. That we know is true of some of the most regular and spectacular of the showers of meteors which visit the earth year after year at the same time. We have to picture the comet's fairly compact assemblage of stones as having been broken up, and the stones as having been strung out farther and farther along the great ellipse on which the comet used to travel. The first conglomeration of the stones may still keep fairly well together, but the others may stretch out for millions of miles.

THE METEORS WE SEE AS THEY GO SHOOTING THROUGH THE SKY

When the earth, on its path round the sun, crosses one of these old cometary paths, a shower of meteors always occurs. If it should chance to run into the thickest part of the swarm, where once the nucleus was, there is a great shower. This is what happens with the most famous of the showers, the Leonids, as well as with those which are called the Bielids, because they are the dispersed fragments of Biela's Comet. With these two the shower, or swarm, does not happen every year, because the stones have not been strung out very far, though we may mention that the swarm of the Leonids takes three years to pass a given point.

Some think that the Leonids are part of a comet which used to have a journey of thirty-three years, so that the great swarm of Leonids occurs only once in that time. The Bielids have a 6¾ year period, and, like the Leonids, when they come they appear in November. But the Lyrids, which arrive in the third week of April, and the Perseids (in the second week of August) are punctual visitors every year, because the stones are strung out all along the old path. Possibly the Lyrids were part of a comet which performed a 415-year journey of old; the Perseids may be part of a comet with a journey of 120 years. The Aquarids, arriving in May, may be the trail of Halley's Comet.

THE DUST THAT COMES TO EARTH FROM OUT OF THE HEAVENS

But besides these regular sharpshooters of the heavens there are thousands of others—free-lances which belong to no regular regiment. The number of meteors which a close watcher may see on a clear night varies from six or seven on some nights to ten times that number on others; and if we could keep all the sky in sight, the average would be about forty. But our eye can see a starry stone that shoots only if it enters the air a couple of hundred miles or so away.

If all that come in every day could be counted, the daily shower would run into millions. Some are so small that they could never be seen at all: they are mere dust. Many that make a good show—a streak of light in the skies—can be no larger than walnuts. Some that never reach the earth's surface, but are burned to powder in the rush of their fiery passage, may be the size of small bricks. But when we sweep out the dust of a room we may be sure that some of it was once part of a shooting star.

A LONDON ROOM LIGHTED WITH GAS MADE BEFORE THE EARTH WAS MADE

Not all of it is dust. Sometimes a greater mass comes almost unscathed to earth, in spite of having had a speed of eighty miles an hour when it first reached the earth's envelope of gas, and having passed into ever increasing speed through a hundred miles of it. Many have been seen to fall. There are fine collections in London, Washington and New York. It is not correct to call them shooting stars, as we often do: they are really meteorites, and are sometimes called siderites, or siderolites, and aerolites—names which distinguish those which are of stone only, or limestone and silica, and those which are nearly pure iron, or iron and nickel.

The strangest thing about these stones from the skies is that many minerals known on earth have been found in smaller or greater number in some of them. In the fragments of one from Canyon Diablo, Arizona, which may have been originally the largest that ever fell, though it split into fragments in its fall, were found diamonds! From some others Dr. Odling, at the Royal Institution in London, once extracted enough gas to light up the lecture theatre—a wonderful sight indeed—illumination brought from the skies after being shut up in stone before the earth was born! The largest meteoric stone known, weighing about fifty tons, is at Bacubirito, in Mexico. The second largest was brought from Greenland by Commander Peary, the discoverer of the North Pole. It weighs over thirty-six tons.

THE NEXT STORY OF THE EARTH IS ON PAGE 3783.

Photo, Wor Window Singer Photographic Service.
A display window for Book Week.

THE WONDER OF A GREAT STORE

CONTINUED FROM 3553

MOST of us have played at "keeping store." Some of us have even planned to have a store when we grow up—candy or fruit or flowers, perhaps, that taste and look nice. Few of us have ever deliberately aimed at helping to direct a great department store. But what a vast field for thought, enterprise and organization lies at the back of the great store where we buy so easily the products of our own and foreign countries.

A department store is a store not confined to any one line, like wearing apparel or hardware. It includes everything from groceries to works of art. It is a type of store peculiar to this continent, the few in Europe being copies of American stores or American-owned. Probably it is a development from the village general store which supplies a rural community where shops are scarce and the demand is varied. We all love the errands for shoe-laces or chocolates that take us into the many-perfumed, enchantingly mysterious stores of our holidays by the sea or in the country. They are mostly dark, and the goods shown have surprising neighbors—a bale of cotton living next to a side of bacon, and a pair of tennis shoes by a clump of straw hats.

If you stop to think why there are so many different things in the village store, you realize that it is not because Mr. Jones likes different things, but because Mr. Jones's customers ask for them and thus create what we call "demand." He provides these varied articles, and this is "supply." These two conditions, demand and supply, lie at the root of all trade. In the early days of barter the visiting trader supplied the demand of cruder people with the vessels of a higher civilization, bartering in exchange for grain or skins. As trading advanced, money or pearls became the tender for goods. If the goods were made, they were made by hand, and groups of skilled workers in leather, fabrics and metals arose. Like all groups, they organized, formed guilds, wore special clothes, concentrated along special lines. The streets of any large town in olden days were lined with a number of small shops, each one supplying just one line of the general demand.

With the beginning of factories and the decline of handwork, shops or stores became less the showroom for work done on the premises and more the assembly-room of many different products. The railway, particularly in a new country, made a great difference. People could go out into remote places where land was good for settlement,

and trust to the big stores in town to send things along. It was more convenient to order everything from one place and to receive everything at once, and thus the demand for stores supplying every need arose, and we have the modern department store of to-day.

Such a store, to be successful, must first correctly estimate the demand, then assemble the supply and arrange for its presentment in attractive form, and lastly deliver the goods safely and in good time. In these days, when there are so many stores and competition is keen, and expenses are very high, the demand is artificially stirred up by advertising in many ways. Newspaper announcements, special displays, bargain sales are different ways of stimulating demand. Fashion itself, playing upon the vanity of men and women, is one of the most powerful advertisers that trade has. The world's best dressmakers and hairdressers, in this present age, are thought to be in Paris. Thence come many of the dictates of fashion. Thither go the buyers of women's clothes and the hairdressers of both continents. They return with models and exhibit them: the fashions are set and demand is created.

Fashion is an arbitrary dame. She responds to the hint of the moment. The discovery of a tomb in Egypt plunges the female inhabitants of two continents into Egyptian ornament, fabric and style. An influx of *émigrés* from Russia with perhaps a successfully launched play is sufficient to regulate the fashions of another year. The markets of the world are combed for the glass and silk and feathers necessary to the fashion created. From China, from Bohemia, from the forests of Africa come ships laden with merchandise that later in shining array will deck the counters of your store.

Buyers are stationed in the markets of the world

Sometimes a very large store adopts the practice of having resident buyers in the various markets, and these are able to maintain a continuous flow of merchandise into the store. Then it is possible to obtain the newest things as they appear and to take advantage of any drop in prices or special purchases. Thus, in Manchester the buyer would have his storehouse filled with bales of various kinds of cotton—some made to order, some purchased when prices were low. In Belfast the linen-buyer would have an office; in Paris and in New York the buyers would purchase fashionable clothing. In China and Japan silks, matting, china and works of art are sought for.

Clothes, though an important side, are only one part of the department store's supply. Foodstuffs — grocery, meat, vegetables; dairy products; the furnishings of a house; equipment for athletes; harness for the farm; *objets d'art* in glass, china and metals; drugs and toilet articles, and an endless number of things, call for complicated organizing in buying, marketing and delivery. Some department stores do not merely buy and display: they manufacture.

Some stores own factories of their own

Using the latest machinery, following closely the curve of demand, the factory turns out men's and women's clothing, furniture, leather goods, harness, soap, paints and varnishes. An entirely separate organization from the store itself, though sometimes situated not very far distant, the factory runs under different rules, arranges its workers' hours and work, orders their rooms for work and recreation. Distant or near by, the factory is closely allied to the store in its quick response to demand. In season its rooms teem with workers and piles of work; out of season a sense of space warns the visitor that the factory is not working at full force. You would be surprised at the attractiveness of most of the factories. Great windows reach almost from floor to ceiling round the walls, and the air is clear and fresh, so that the workers are comfortable and happy. The result is that they do better work, the people who buy the goods are better satisfied, and the men at the head of the store find that affairs are prospering. This is what is called "good business."

How science aids industry in the store

Most modern department stores run a research bureau. Here, in one department of it, highly trained scientists—perhaps we could call them industrial chemists—are ready to cope with the queer problems and emergencies that every day brings along. Perhaps a young buyer comes in with two samples of cloth that look, even to his trained eye, very similar. The usual tests give no hint of wearing capacity. It is up to science to

THE OUTSIDE AND INSIDE OF A GREAT STORE

A show window in a store displaying fabrics. The ladies are not real; they are not even models; they are painted in the background. Window-dressing is a highly paid art to-day.

Photo, Underwood & Underwood.

The left-hand picture shows the exterior of a great modern store looming above a city's busy district. To the right we see the interior, with its array of show-cases and counters and lights. A great army of cleaners working over these stores by night has them fresh and clean for us by the morning.

make some experiments that will indicate which of the two is the better purchase. Then an ingenious machine with a friction pad is brought into use, and after a few seconds it is apparent which cloth, in the same time and exposed to the same friction, stands up better.

A number of ice-boxes are sent in. Which to recommend? A good housewife wants an ice-box in which stronger-smelling food does not taint butter and milk; she wants an ice-box that will keep her ice for the longest period. These are questions of materials, proportions and ventilation. The "chemist" places his herring roe and his butter in two of them; he tests his ice-block in a third and fourth.

Customers wanting wool clothes want them all wool, or silk garments all silk. Beneath the microscope the fabric yields up its secrets. A ball of twine, after stretching to a certain length, will break at what pressure? A Swiss machine gives the answer. Often the research bureau has another capacity. It serves as the investigating organ of the store. Its investigators examine merchandise that comes into the receiving-rooms to see that it reaches the standard; they check up to make sure that the goods in catalogues are as they are advertised.

A rest-room for the women employees in the factory of a modern store. Sometimes the chairs are pushed back and dancing indulged in.

THE DELIVERY SYSTEM THAT BRINGS YOU YOUR PARCEL

Before we leave the thought of factories and research to go to the store itself, let us consider the delivery system. Perhaps you have not thought it so very wonderful that your bottle of ink came home unbroken, or that your flowers arrived quite fresh. But remember that thousands of other parcels, fragile and perishable, precious or inexpensive, have gone out to-day in the city or district where you live. It is evident that a good system lies behind it.

Systems differ in localities and stores, but in their main outlines they are the same. Let us suppose that we have bought a boy's overcoat and asked to have it sent to our home in the city. After being wrapped up our parcel is dropped to a spiral chute which conveys it to the basement. There it is placed on a wide parcel belt by a man called a "router." He knows every street in the city and puts our overcoat on a belt which will convey it to the store delivery station serving our street. If the string is badly tied, or the address looks wrong or insufficient, the parcel will be wrapped again and the address rectified by telephone book or directory. Arriving at the store station, the routed parcels are taken

MAIL-ORDER AND CITY DELIVERY

Smaller parcels are conveyed by chutes to the sorting-place and thence to wide parcel belts. To direct the stream are "routers"—men who know their geography. They place the parcel ready for its mailing. Here also addresses and wrappings are inspected and insufficient ones rectified.

Daily from a great store parcels go out in an unceasing stream, which calls for efficient directing and clear organizing. Of the many thousands that are daily shipped it is rare that any go wrong where the customer has been careful to give a full address.

3677

in small trucks, each painted in a special way to mark its city station, which are pushed on to a fleet of motor vans. These vans are due to leave on schedule for the city delivery station, and there the parcels are again routed by streets and sent off in one of the delivery wagons. Each driver is responsible for the parcels in his wagon after they have left the sorters, and any mistakes can thereby be traced directly back to the person who is to blame. Most stores find horse delivery more satisfactory than motors, and the horses are well housed and cared for and given summer vacations.

If we buy furniture or heavy crated goods, they would probably be sent direct from the store without an intermediate station.

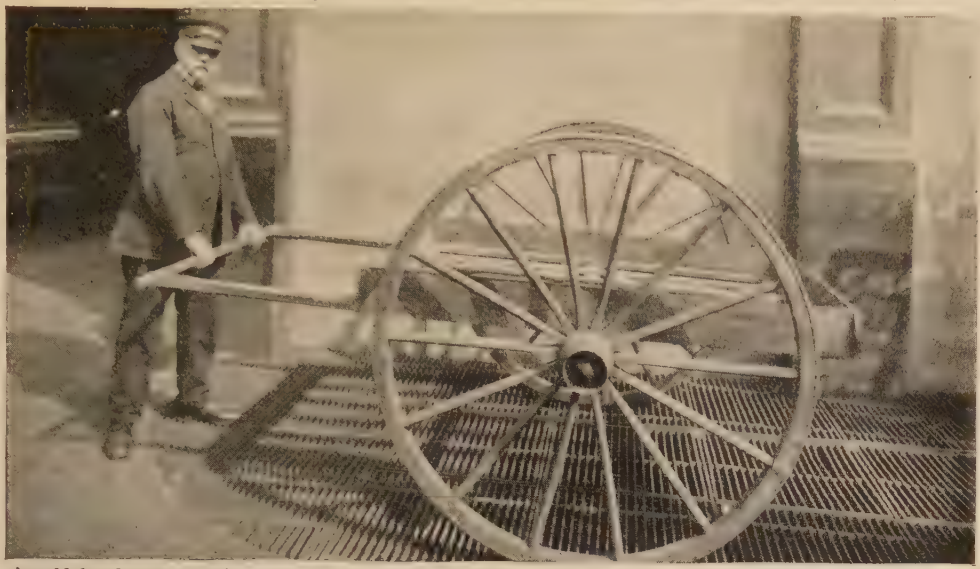
THE MAIL-ORDER SERVICE AND THE CITY ORDER

The mail-order service is an important part of the store's activities. In the East it will send out a daily stream of packages for the fishing villages and resorts on the coast, for the farmers in the country districts, for the mining, milling and factory towns. In the West the needs will be served from the middle west and prairie cities. This part of the trade is dependent upon a catalogue, usually issued in the spring and fall of the year. It is invaluable in rural districts, and after the orders have been made up, they are handled by express companies and the Post-office Department.

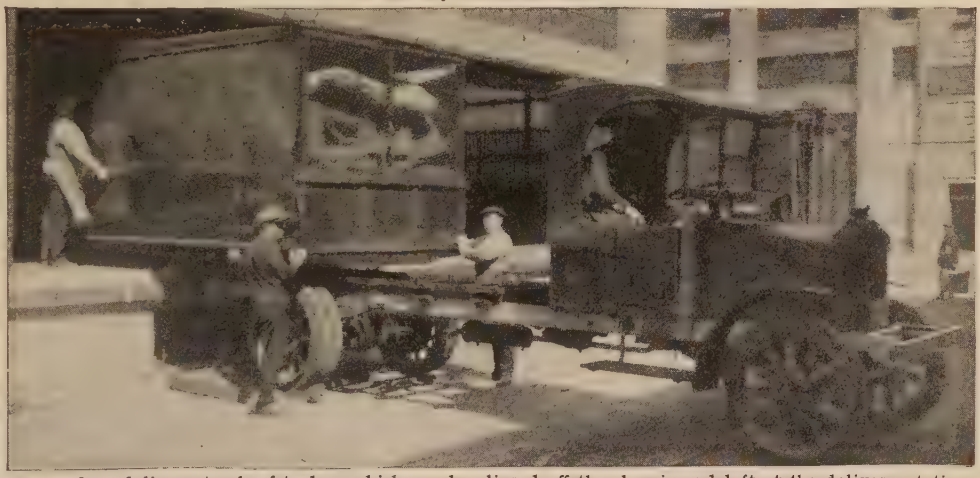
Busy housekeepers who know that they can rely on the quality of the merchandise, instead of breaking their day by going to town, use the telephone. The large stores have their own direct lines and exchanges. Boards with lists of articles whose prices change are posted daily in full view of the operators. In order that a customer who telephones for articles from several departments can give her order in one call, a "city-order" telephone service is also arranged. When the orders have been taken, they are sorted and delivered to the departments where they belong. In the groceries' order department, men take the larger orders, and girls the smaller. First they collect their potatoes, flour, tea, soap, and so forth, set them aside in a compartment until the order is filled, then wrap it and send it by the belt to the routers for the delivery. When the delivery is closed for the day a notice is posted to that effect.

Here is what is called a "city-order" service which takes orders for articles from different departments, relays them and sees that they are filled.

DELIVERY, YESTERDAY AND TO-DAY



An old hand-cart was the earliest form of city delivery. Run by a single "driver," it made its round in the days of horse traffic.



The modern delivery truck of to-day, which can be slipped off the chassis and left at the delivery station.

A "fleet" of motor trucks ready for action. Run upon a regular and strict schedule, these handle the tremendous delivery of to-day.

Photos, courtesy Robert Simpson Company, T. Eaton, Hudson's Bay Company, and R. H. Macy.

A splendid feature of modern store system is the exchange, where you can return unsatisfactory purchases. The honesty of the customer is relied upon almost entirely, and great satisfaction both to the store and the customer is the general result.

A VARIETY OF CONTRIVANCES TO MEET YOUR CONVENIENCE

In addition to the order and delivery facilities there are usually many others. For people who shop in person there are dining-rooms, rest-rooms and information bureaus. Some stores even have offices where you may learn about concerts and theatres and may buy tickets for any that you wish to attend. The shopping service is of tremendous value to out-of-town customers, not only in selecting and buying goods, but in furnishing suggestions and information so satisfactory that orders almost always follow.

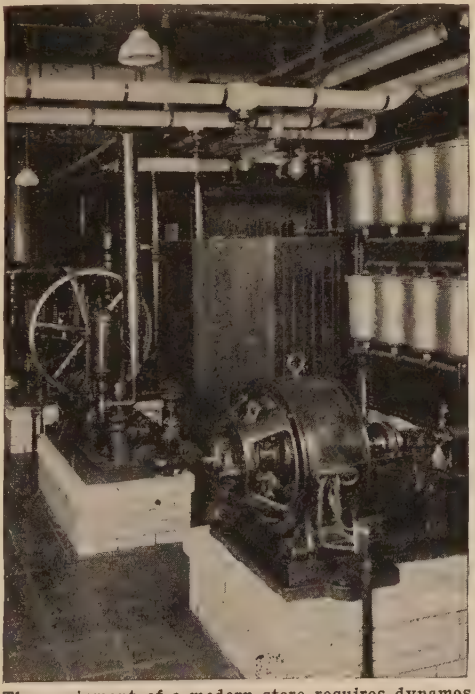
The standard of service given by a store depends, needless to say, upon the people who do the work—the employees. Good business men realize this, and put forth every possible effort to equip their employees both mentally and physically so that they will do their work under favorable conditions. Office workers receive most of their general training, of course, in business schools and need to learn only such things as are part of the individual system of the office in which they are placed. This can be done best by working right in the office, under the careful supervision of more experienced workers.

Salespeople, however, must learn all the details of the store system and the use of salesbooks before they begin to sell. There things are taught in classrooms, where all the system of a salesclerk's duties are made clear by expert instructors. The employees work, as a rule, in as healthful surroundings as can possibly be arranged, and cases of illness or accident are looked after in small well-equipped hospitals. Often, too, a dentist is in attendance to give advice and treatment. Life- and accident-insurance policies are issued by the firm, and pensions and annuities are arranged for. A summer camp gives vacation facilities.

A section of a store hospital. Generally during business hours every large store maintains its hospital under the care of trained nurses. Here customers as well as employees are cared for, rest and quiet may be found, and first aid rendered if necessary. Often, too, there is a dental office with a dentist in attendance to make examinations and afford temporary relief.

DIFFERENT PHASES OF THE MODERN STORE

Some stores run a restaurant for the convenience of their customers, who can accomplish a great deal more if they do not have to interrupt their day. Out-of-town customers find it a meeting-place for city friends.



The equipment of a modern store requires dynamos to generate current for light and power.

A corner of a modern department store where linen and blankets are sold.

A VISIT BEHIND THE SCENES OF A STORE

A day spent in investigating the parts of a store building which the public does not usually see would be well spent. The large structure is like a beehive, its layers of cells humming with industry. As a rule, the offices of the store are at the top of the building, away from confusion and noise. Here are kept the accounts, records of purchases, and sales and exchange transactions.

Not all the stock is bought by traveling or distant buyers. Sometimes "the mountain comes to Mahomet," and agents from other firms bring samples of their wares to the store. In small rooms on the office floors resident buyers look over the goods and place their orders.

A place that you would probably like very well is the refrigerating plant, where ice is manufactured for all the grocery, meat and dairy cold storage, and where ice-cream is prepared for the dining-room.

Queer little offices, tucked into odd corners of the upper floors, take care of parts of the business that you never would have thought of. The stockrooms, with piles of bales and boxes all neatly numbered and ticketed, are dark and silent, and suggest interesting mysteries.

Such an institution as the store we have thought of is almost self-supporting. It supplies its own power for the operation of elevators. It has a filtration plant to furnish a constant supply of cooled and filtered water. It has its own cable station and post office. Automatic-sprinkler systems cover the buildings for fire protection, and would cause a screen of water to play upon and very quickly quench an incipient blaze. For the printing of catalogues and pamphlets it will probably have a printing plant with the latest machinery for printing and binding. To travel quickly from floor to floor, passenger elevators and escalators are in continuous movement. To hasten the making of change, carriers speed through pneumatic tubing at the rate of sixteen feet a second. Cash registers handle small purchases. Fans to change stale air by suction, a master clock to control automatically all other clocks, and dismissal bells are features of the modern store, which someone has justly called a good example of exact practical science.

There is considerable clerical work to do in a big modern store. Besides mail orders, and general correspondence there are accounts of various kinds, and adjustments and a multitude of other matters to be taken care of.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 3791.

Here we see how the eyes grow out of the brain, the optic nerve projecting till it expands into the hollow cup of the eyeball. The muscles that move the eyes are also shown.

THE STORY OF THE EYE

CONTINUED FROM 3561

THE highest sense we have is vision, and the organ of vision is the eye. Its history is deeply interesting. In the very lowest forms of animal life we find response to light. Some of the simplest kinds of animal will always travel from shadow into the light, and others will always travel from light into shadow.

Probably the first suggestion we have of an eye is where we find that in certain lowly animals parts of the skin are very sensitive to light. We find in such cases that the color of the animal changes according to whether it is in light or in darkness. When its skin is examined under the microscope we find that it contains a large number of cells packed with colored material.

This is usually called pigment, which is simply Latin for "paint." These pigment cells are sensitive to light. When light shines on them all the pigment is gathered tightly into the body of the cell; but when the light is taken away, and they are in shadow, the pigment strays out in all directions from the centre of the cell, and so is scattered. This explains why the color of the animal changes, and it also tells us why and how the animal is able to know what the state of the light is.

We do not know exactly how light affects the pigment cells, but we may be sure the action is a chemical one. Everyone who is interested in photography knows that light has a chemical action, as, for instance, on the salts of a photographic plate. Every housewife whose curtains fade sees the effects of the chemical action of light. Its action on the pigment cells is chemical also; and when we study what happens in our own eyes when light strikes the curtain at the back of them, we find that what happens there is very much like the action of light when it takes the color out of a curtain.

What happens next in the study of the eye is very interesting. We find that the pigment cells, which were at first scattered about the surface of simpler animals, are specially collected in certain places. These cells are not quite on the surface of the skin, but are underneath the outer skin. The next stage is that at the place where the pigment cells are gathered together the outer skin, or *epidermis*, is thickened and bulges a little. This is important, because if we have a curved surface through which light must pass on its way to the pigment cells we have indeed a lens of the shape called

convex. As in the case of the burning-glass or the lenses of leaves, the light is focused.

These pigment cells, like every other part of the body, are connected by nerves with the brain. We have now reached the stage where there is a lens to focus light, sensitive cells to be chemically affected when light falls on them, and nerves that somehow convey a record of these changes to the brain, which therefore *sees.* Here, then, is a simple kind of eye, complete from the surface to the centre. All the eyes of animals that have no backbone are to be looked on as simply improved patterns of this kind.

The eye of a fly.

As we shall soon find out, the eyes of backboned animals are of a much higher type; but we must not under-rate the eye-power of all creatures below the backboned animals, because the eyes of some insects are exceedingly keen. But let us look at the eyes of backboned animals. Wonderful as the eyes of insects may be, the eyes of backboned animals are of a vastly finer type.

The eye of a fish.

In the first place, this seems to depend on a change in the making of the eye. While the eyes of all the animals that have not backbones are formed entirely from the skin, the higher type of eye has its most important parts developed from the brain. True, the front part of such eyes is formed from the skin, but that is true only of the parts through which the light travels on its way to the all-important curtain which makes the back of the eye. That curtain is really a part of the brain. This is the real reason why the curtain, or *retina,* of the eye of backboned animals has its great powers.

The eye of a man.

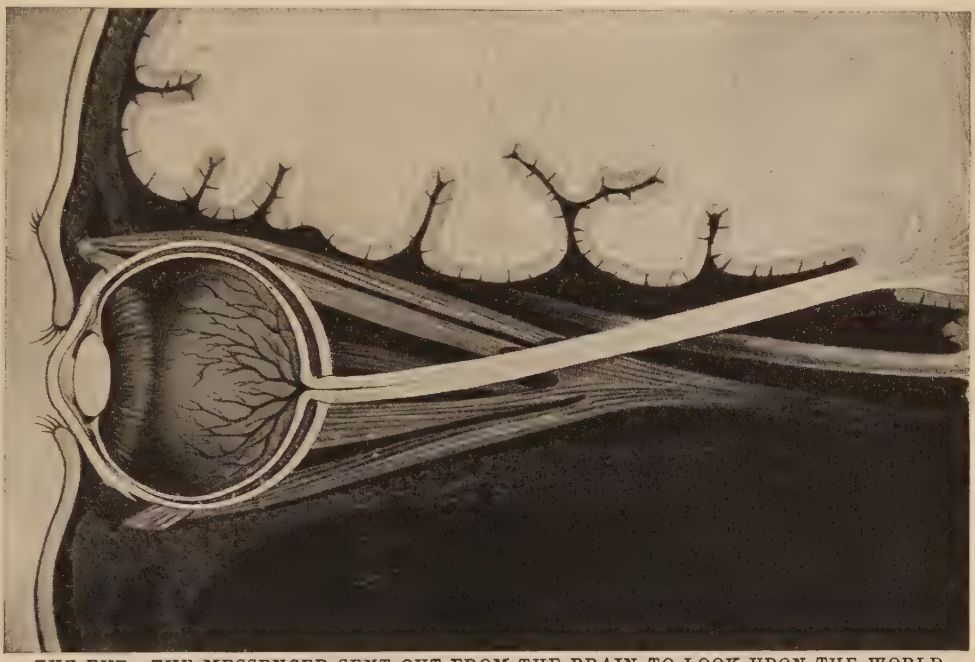
When we examine the eye, the first thing we notice is that the front of it is transparent. This transparent part is called the *cornea,* which really means "horny thing." The great business of the cornea is to be perfectly transparent. It therefore contains no blood-vessels; it would not do to have red or white blood-cells in the cornea interfering with the passage of light. But the cornea is alive and must be fed. It is supplied with materials which pass to it through the walls of the tiny blood-vessels all round its edge. The cornea is well supplied with nerves, nearly all of which run to its front surface, in order that it shall be very sensitive.

This is necessary so that the least speck of dust, or anything else that would injure it, shall be felt and wiped away by the eyelids and the tears. All the light we see by must pass through the cornea; yet it is a living thing, with all the needs and delicacy of a living thing. Lastly, it is very much exposed; though, as we know, the eyelid, eyelashes, eyebrow and the bony wall around the eye do their best to protect it. All round its edge the cornea passes into the white, thick, strong coat of the eyeball. Indeed, the cornea is really a special part of this strong outer coat of the eyeball, which has been made transparent, and made to bulge forward a little, in order to help in focusing the light. The white outer coat of the eyeball is very strong, and will stand a good deal of pressure.

When we look at anyone's eye, we see something through the transparent cornea. We see a round colored ring with a black hole in the middle. The colored part is called the *iris,* and is a ring of muscle; the hole in the middle is the *pupil.* This looks black because it is really the hole leading into the dark chamber inside the eye which is like the inside of a camera. If we could be shown an eye cut through sideways, we should see quite a large space between the cornea and the front of the iris. This space is filled with a watery fluid, called the *aqueous* (watery) *humor,* and the

light has to pass through this fluid before it reaches the pupil.

The business of the iris is to regulate the size of the pupil. The less the amount of light, the larger must the pupil be; the more the light, the smaller the pupil. So when a person goes from darkness into light, or when the eyes are opened in a bright light, anyone may see that the pupil gets smaller. We can also notice that the pupil gets smaller if a person who has been looking at something far away suddenly looks at something near. The reason why it improves the clearness of vision to reduce the size of the pupil when looking at something near is to be found in the shape of what lies behind the pupil.



THE EYE—THE MESSENGER SENT OUT FROM THE BRAIN TO LOOK UPON THE WORLD
The optic nerve to the left eye crosses the nerve to the right eye, going round the retina as far as the lens.

All the color in the eyes is due to the iris. Both on the back and front of the iris is a layer of cells which may or may not contain a certain amount of pigment. It is this that varies in different people.

Some eyes have brown pigment in the cells on the front of the iris, and others have not. This gives us two great types of eyes—those which have the brown pigment on the front and those which have not, the latter being more or less blue. There are, of course, many different blues and browns, and many eyes which could not be called either; but a curious thing is that no father and mother with genuine blue eyes ever had brown-eyed children. On the other hand, if one parent has brown eyes and the other parent has blue eyes, most of the children will have brown eyes. At the present time it seems quite plain that blue eyes are becoming rarer and brown eyes commoner. One wonders why this should be so, and what the consequences will be.

Though the blue-eyed seem less able to bear city life, and the conditions of existence nowadays, they may yet have many valuable qualities, and their slow disappearance may be a great loss to the world. Therefore it would be well to study the matter and find out how the blue-eyed can be preserved.

Now, in the iris we find a beautiful transparent thing called the *lens* of the eye. It is a genuine lens, like the lens of an ordinary magnifying glass, and it is of the same shape, convex on both sides. It helps to bend the rays of light entering the eye, as the cornea does, and it is perfectly transparent. Unlike any lens that man has ever made, this lens, while able to do all that artificial lenses can, can do far more, for it is elastic and can change its shape as we please.

The lens lies inside a little bag, and the bag has fibres attached to it all around, which can be pulled on by tiny slips of muscle inside the eye. When the bag is pulled on in this way, the lens inside it is made flatter. When the muscles stop acting, and the pulling ceases, the lens is free to bulge out again if it is perfectly elastic. It is by this power of the lens that we are enabled to see clearly both at short and long distances.

We can see that the shape of the eyeball is very important and that its elastic quality is of great value. An eyeball may be long from back to front, and then the lens is far from the retina, or it may be short from back to front, and then the lens is nearer the retina. If the lens is of the same shape in the two cases, one eye or both must certainly not be quite suited to its purpose. Thus, because of the varying shapes of eyeballs, the differences in the curve of the cornea, and the variations in the shape of the lens itself, we find that there are a very large number of people whose eyes are not perfectly suited for all kinds of use.

The Pupil through which the Light passes
The Iris which regulates the amount of Light that enters
Upper Eyelid
The Gland where the Tears are made
The Canal through which the Tears pass to the Nose
Lower Eyelid

The left eye, showing the gland where tears are made, and the duct through which they are carried to the nose after washing the eyeball. In weeping, the tears cannot all pass through the ducts, and overflow.

This is not at all a question of the health of the eye. An eye may be healthy or ill, like any other part of the body. What we are now talking about is simply a question of the shape of the eye, or of certain parts of it. The bending of rays of light is called *refraction*, and so we usually speak of "errors of refraction" to describe those cases where an eye is nearsighted or farsighted, or has some defect of that kind.

It is commonly found that the cornea is not quite regularly curved; it bulges more or less in one direction. This means that, if we are looking at a cross, one limb cannot be seen as sharply as the other. As a rule, this defect in the shape of the cornea is so slight that it is not worth bothering about; but often it is worth while to wear glasses which are more curved in one direction than the other.

Nearsightedness is what happens when the eyeball is too long from back to front. This error of refraction means that the light is focused before it reaches the retina. When it does reach the retina the picture it makes is rather blurred. Sometimes nearsightedness may be due to the cornea's being too much curved, so that it acts as too strong a lens, and the rays of light are focused too soon. Nearsightedness is a very common defect, and is very inconvenient. We can see anything near quite well; the things farther off are blurred. The reason why we see things clearly when they are quite near, and why we therefore always hold a book close to our eyes, is that, when a thing is held close, the eye catches the light rays from it as they are spreading out. Near sight is not a disease at all; the changes which go on are natural, and they go on only to a certain point.

After a certain age, perhaps about forty-five, the eyes begin slowly to become farsighted, or less nearsighted, as the case may be. Practically all very young children are farsighted.

The passing of near sight as we grow older is due to changes that occur mainly in the lens of the eye. The elasticity of the lens becomes less, and it does not bulge as readily as it used to do; indeed, it becomes decidedly flatter. In extreme old age the lens loses its elasticity to such an extent that its shape cannot be changed at all. For this reason most people when they come to middle age must wear spectacles, which will cause the rays of light to come together at the proper distance from the front.

In old age, sometimes before it, the lens of the eye may become opaque, losing its transparency altogether. *Cataract* is the name applied to this opaqueness of the lens, and its consequence is blindness. The time was when there was no remedy for this terrible affliction, but it can now be cured by an operation without pain. Many people are now happy and efficient, who would have been entirely blind if they had lived not so many years ago.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 3801.

Robert Browning at twenty-one.

Elizabeth Barrett Browning.

Robert Browning at sixty-five.

THE STORY OF THE BROWNINGS

CONTINUED FROM 3472

ONLY once in the story of the lives of notable poets has it happened that two fine poets married each other.

The single exception of such a marriage occurred in English literature when, on September 12, 1846, Robert Browning married secretly, at Marylebone Church, London, Elizabeth Barrett. They lived happy ever after—that is, till nearly fifteen years later when on June 29, 1861, Elizabeth Barrett Browning died in her husband's arms at Florence.

Each had made a name of some note as a poet before they met; indeed, it was as poets that they met. Each had taken the writing of poetry as the work of a lifetime, and had published half a dozen volumes. Robert Browning's were chiefly plays. Elizabeth Barrett's were the outcome of reading the poetry of Greece, and of a strong romantic and sentimental strain in her own nature.

Miss Barrett was so absorbed in the literature of Greece that when she was ill, and feared that the doctor would forbid her reading anything as serious as the Greek poets, she had them bound to look like modern novels. But she never, in her own writings, imitated the Greek line, packed with meaning in so little space. She herself was usually diffuse and leisurely, with scatterings of fine thoughts leading us over more ordinary tracts of writing.

It was a poem which she published when she was thirty-eight, Lady Geraldine's Courtship, that brought Robert Browning, then thirty-two, to her side in her darkened room in London. There she lay a supposed lifelong invalid. To Lady Geraldine's country house in the poem came, by invitation, a humbly born poet, and read poetry to her. Sometimes he read the older poets.

Or at times a modern volume—Wordsworth's solemn-thoughted idyll,
Howitt's ballad verse, or Tennyson's enchanted reverie,
Or from Browning some Pomegranate, which if cut deep down the middle,
Shows a heart within blood-tinctured of a veined humanity.

That was the reference to Browning in Miss Barrett's poem. He was then publishing poems under the title Bells and Pomegranates. The suggestion was that some of them were sweet, like bells, and others like the pomegranate, which does not surrender its flavor so readily.

Evidently pleased to read this about his own poems, Browning asked permission to call on the writer, who was clearly one of his admirers. So began an acquaintance that was soon to ripen into love.

Robert Browning's father, employed in the Bank of England, was very well off

financially, and was a cultured man with a good library. The mother was half German and half Scottish. Robert was born in London, May 7, 1812. The easy circumstances of the family made it unnecessary that the son should give up his ambition to be a poet. His father encouraged that ambition, and so, like Milton, Wordsworth and Tennyson, Browning lived all his life for poetry.

THE POET WHO EDUCATED HIS READERS IN HIS OWN STYLE OF WRITING

Like those poets he was, as Wordsworth described himself, "a dedicated spirit," and in the truest sense a profoundly religious man. But, unlike theirs, his genius was dramatic, and a large number of his poems were dramas of greater or less length, though few of them were suited for the stage.

Browning was one of the most original of the poets. Quite early in life he understood that he must write in his own way, whether he was understood by others or was not, whether he was popular or unnoticed. For a long time he was not understood, and he remained comparatively unnoticed; but gradually he educated his readers in his own style of writing, and became almost popular. For those who appreciated him were enthusiastic, and everyone came to know that he was a great poet, though they might not take the trouble to understand more than his simpler poems. Not during the lifetime of his wife, however, did he win this general fame, though he produced work which deserved it. When he first knew her, he was still comparatively unsuccessful, and indeed as far behind her in popularity as he came to be ahead of her at the close of his life.

HOW BROWNING PAVED THE WAY FOR THE FAME THAT WAS TO COME

Browning's preparation for his work was an immense amount of varied reading in his father's library, with travel, and his own thinking. He had a gift for making friends and knew many people worth knowing because of their personal qualities. He saw human nature as it displays itself in other lands and races.

Before he met his wife his writings had been chiefly dramas, several of which were acted with moderate success, and a philosophical poem, Paracelsus, on the parts played in life by knowledge and love. His one English drama, Strafford, had been acted by Macready. Sordello, when published in 1840, was regarded as exceedingly difficult to understand. The same view has been held of it ever since, even after Browning's tricks of style are familiar to us.

Miss Barrett had had an extraordinary education. She knew Greek almost as well as English. Her original name was Moulton, but her father took the name of Barrett when he inherited an estate from his grandfather Barrett. She was born in County Durham on March 6, 1806, but lived during her girlhood near Malvern, and afterward in Devonshire. Then she was brought as an invalid to London by her amazingly eccentric father. Spinal weakness through an accident kept her secluded a good deal, and the death through drowning of a dearly loved brother brought her almost to death's door. The chief difficulty, however, against making a recovery was the obstinate oddity and tyranny of Mr. Barrett.

THE WONDERFUL POEMS THAT CAME FROM A DARKENED ROOM

Scarcely anyone was allowed to see his clever daughter, who spent her life on a couch in a darkened room. One of his fads was a determination that no daughter of his should be married, and when Robert Browning and Elizabeth were finally married, and another sister also, the cruel old man never spoke to them again.

During these years of ill-health Elizabeth Barrett wrote half a dozen volumes, which included poems now quoted in every full collection of English verse. Among them were Cowper's Grave, Hector in the Garden, the exquisite Romance of the Swan's Nest, Lady Geraldine's Courtship (the poem which brought Robert Browning into her darkened room) and the noble Cry of the Children. This was a protest against the cruelty which then kept small children at work for long hours in the factories. It was all too true in that darkest day of England. By her poem Elizabeth Barrett took a leading place in the ranks of English reformers, and helped to pass laws regulating the employment of young children.

Into the life of this restrained but beautiful-minded woman came the manly poet Robert Browning. With the help of loving friends he carried her off to marriage, comparative health, and the summery climate of Italy, till she could say: "I took it for pure magic, this life of

The view from Browning's Paddington home which reminded the poet of Venice.

Where the Brownings loved to walk by the river Arno.

Mrs. Browning's tomb in Florence.

Where Robert Browning died in Venice.

Elizabeth Barrett's home in Wimpole Street, London.

Browning's home, 9 Warwick Crescent, Paddington.

Browning's last London home, in Kensington.

mine. Surely nobody was ever so happy before." Her happiness was complete when, in 1849, her son, the second Robert Browning, was born, and history contains no finer love story than this of the two poets.

MRS. BROWNING'S BEAUTIFUL TRIBUTE TO HER HUSBAND

The spirit in which they loved each other is expressed in forty-four sonnets by Elizabeth Barrett Browning, which she called Sonnets from the Portuguese. They are not from the Portuguese, but are the direct expression of the soul of a woman who, expecting death, found love. Hear the beating of the pulse of love in this sonnet to her husband.

How do I love thee? Let me count the ways.
I love to the depth and breadth and height
My soul can reach, when feeling out of sight
For the ends of Being and ideal Grace.
I love thee to the level of every day's
Most quiet need, by sun and candlelight.
I love thee freely, as men strive for Right;
I love thee purely, as they turn from Praise.
I love thee with the passion put to use
In my old griefs, and with my childhood's faith.
I love thee with a love I seemed to lose
With my lost saints. I love thee with the breath,
Smiles, tears, of all my life! And if God choose
I shall but love thee better after death.

After her marriage Mrs. Browning wrote, besides these sonnets, a number of miscellaneous poems and two of greater length. Casa Guidi Windows expresses her longings for Italian liberty as she watched the world from her home in Florence. Aurora Leigh, intended to be her masterpiece, is a slender story in blank verse, carrying much reflection on life.

A WORK THAT IS REMEMBERED FOR ITS LITTLE PICTURES IN WORDS

Aurora Leigh became instantly popular and was distinctly the book of the day in poetry; but it has not held its own as a whole. It is now read only for the patches of description and flashes of thought which show the writer's intensity of mind to have been finer than her art in expression. She could sketch a delightful miniature, but not fill in the full canvas of a considerable book.

Here are some illustrations of her power of making a little word-picture.

Women know
The way to rear up children (to be just),
They know a simple, merry, tender knack
Of tying sashes, fitting baby-shoes,
And stringing pretty words that make no sense,
And kissing full sense into empty words,
Which things are corals to cut life upon,
Although such trifles.

Or for an example of quiet description of an English lane, this is how she shows

The happy violets hiding from the roads
The primroses run down to, carrying gold;
The tangled hedgerows, where the cows push out
Impatient horns and tolerant churning mouths
Twixt dripping ash-boughs—hedgerows all alive
With birds and gnats and large white butterflies,
Which look as if the May-flower had caught life
And palpitated forth upon the wind.

Mrs. Browning was a woman gentle and sentimental in spirit, but strong in thought where sentiment did not rule her. She is not consistently artistic enough to be called a great poet. She had little constructive or dramatic power. Yet when we remember how secluded was her life till middle age, and how artificially it was narrowed by the folly of her father, the amount and general quality of her verse is remarkable. For a combination of sweetness of spirit with power of thought she is the most remarkable feminine figure in English poetry.

WHY MANY OF BROWNING'S POEMS ARE HARD TO UNDERSTAND

Like his wife, Robert Browning will live in English literature through his short character studies and lyrics rather than through his longer and more ambitious plays and poems. He will live in spite of the strangeness of his style, which sometimes seems to have a carefully manufactured obscurity. Before we have mastered the poet's grammatical peculiarities, a good deal of his poetry will seem just a collection of words without any meaning. It is quite possible that we may not like his verse at all until we are a little older.

Then we should take some characteristic Browning poem and study it carefully until the poet's habits of composition become plain. A very suitable poem for this purpose is The Strange Epistle of Kharshish. It has a clearly defined subject, and it illustrates nearly all Browning's tricks in construction.

To appreciate the poet's skill we must understand that very rarely is he writing about his own experiences, or out of his own character. He selects a known char-

acter, or a dramatic situation, and paints it with the inventiveness and power of his imagination. The number of characters and situations pictured in this way in Browning's works is amazing. They must not be regarded as referring to Browning himself, except in three or four clearly personal references to himself and his wife.

THE IMAGINATION ROBERT BROWNING PUT INTO HIS POEMS

The poet stands apart and sketches and analyzes the people in his pictures, generally by making them speak their own thoughts. Take two of the most popular and simple of his poems in schoolbooks—Evelyn Hope and How They Brought the Good News from Ghent to Aix. Browning is not the watcher by the side of "beautiful Evelyn Hope" after she is dead. Evelyn Hope is imaginary, and the watcher is imaginary. The poem is an effort of imagination. There was no ride from Ghent to Aix, but the poet describes a gallop that might have been with as much gusto as if he had carried the good news himself.

His poems tell of a general situation that is widely true and does not refer to any particular person or place. His poem on Popularity, describing the fleeting nature of public favor, does not refer to any one rejected idol of the people. His Lost Leader is not one particular deserter of principles once held.

Browning's greatest power shows itself when he takes a character, real or imaginary—real as in the cases of Saul and Lazarus, imaginary as in the cases of Bishop Blougram and the physician Kharshish—and lets his imagination play around them and make them real. Kharshish is a wandering Arab physician who arrives at Bethany about thirty years after the crucifixion of Christ. There he has Lazarus brought before him as a medical case.

THE MIND OF A MAN WHO CAME BACK FROM THE DEAD

How would Lazarus live on after having been dead and buried and brought to life again? Browning imagines the state of his mind following such an experience. He describes it in the language of the Arab doctor who has been consulted about Lazarus.

The description is in a letter sent to the master of medicine, Abib, who has taught Kharshish—"breeder in me of what poor skill I boast"—and it contains as well half a dozen threads of interest. It tells of the physician's travel adventures and observations of the unsettled state of Judea. It speaks of the writer's doubts about the honesty of the "ambiguous Syrian" who carries the letter. It describes the seemingly dazed state of Lazarus' mind, and the strange story told by Lazarus of the Nazarene physician who "perished in a tumult long ago," but who, Lazarus declares, "bade him rise, and he did rise" from the dead. What Lazarus has told Kharshish perplexes him greatly. He pretends to make light of it, and yet we can see he is profoundly impressed by it, and indeed believes it, fearing to do so, yet wishing to do so. All this mingling of interest is conveyed with extraordinary vividness by the poet in the form of a letter. It is a triumph of imagination, expression and profound thought, when once his somewhat difficult style is unraveled.

THE STORY BROWNING TOLD FROM TWELVE POINTS OF VIEW

The most striking of all the poet's works is his masterpiece, The Ring and the Book, and it best shows his method of bringing his imagination to bear on a subject. He finds an old Italian book with an account of a trial for an atrocious murder. To illustrate variety in human character he describes what took place as it was seen by twelve different people. So much in human life depends on the angle from which we look at it, and Browning had the power of placing himself at any point of view. In that respect he probably stands next to Shakespeare in English literature. His insight is startling, and if he had had greater freedom and clearness in expression, he would have been one of the greatest poets. As it is, he is a great poet who locks up his meaning in rugged forms of writing which may repel us at first.

Browning was notably a strong man, in faith and thought and word. He believed intensely in the most vital truth that can inspire the hearts of men. "A battle's to fight ere the guerdon be gained," was the summing up of his creed. That great faith nerved him throughout a strenuous life of thought and kept him young to the day of his death. He died in Venice on December 12, 1889, and he rests in Westminster Abbey among the poets.

THE NEXT STORY OF LITERATURE IS ON PAGE 3891.

On the mountain at Montreal our young Canadian is beginning in good time to get his balance on ski. He has some wonderful hours ahead of him. Photo, Chesterfield & McLaren, Montreal.

Bob-sleighing at Ste. Marguerite in the Laurentian Mountains when the surface is just right and a bright sun makes the trees cast long shadows across the glistening white. Photo, Canadian Pacific Railway.

Off on snowshoes for a hike.

WINTER SPORTS IN CANADA

THIRTY years ago there used to be built every winter in Montreal an ice palace. Its walls were of the clearest blue ice; its architecture was that of an old English castle; and both in daylight and at night, when it was gaily illuminated, it was a thing of beauty. But Montreal no longer builds ice palaces. The people who lived there thought that it gave to outsiders a wrong idea of their city and of its winter climate. It made all the world, they said, think of Montreal as lying in the Arctic regions. They remembered, too, that when the Canadian Pacific Railway was being built and immense sums of money had to be borrowed, it had been hard to secure loans in England. People who had money to lend thought that the railway was sure to fail because of the severity of the Canadian winter. But even though no one now thinks of building an ice palace, there has been a great change of view with regard to the Canadian winter. There is no question but that, over much of Canada, two or three months of really cold weather can be expected. But it is just because this winter can be counted upon that it is possible to make such use of it and to enjoy it so much.

During those months when the ice is two or three feet deep on the lakes, and when snow covers the ground, the sun shines for most of the daylight hours, and the air is so still that the cold is hardly realized. Sunshine and quiet cold weather make most healthy days. You plan a sleigh ride for a certain night and your arrangements seldom have to be altered. In all likelihood there will be no wind, stars will be clear overhead, and the dry snow will crackle under your feet. But even suppose it is snowing, what does it matter? You are not going to be allowed to sit quietly in the sleigh rolled up in a buffalo robe. You will be tumbled off into the snow by artful dodgers watching their chance. Nor will you submit mildly to such treatment. You will attack when you are attacked, and so when you arrive at the farmhouse where supper awaits you, you will be glad to shake the snow from your collar before you enter the warm kitchen.

HOCKEY THE MOST CHARACTERISTIC SPORT

Of all Canadian winter sports the most characteristic is hockey. Of course ice hockey, in its general idea, is not new. Wherever boys had a sheet of ice, some sticks and a ball, or a cork, some game was sure to be played. Dutch pictures some three

hundred years old often show a game something like hockey. But just as baseball developed from rounders, so this splendid game of hockey has in its speed and cleverness become a very different thing from its happy-go-lucky parent.

Hockey was first organized in Canada in the Eighties, when the Victoria Club in Montreal used to play with McGill University, and the Royal Military College at Kingston with Queen's University. Before each game rules were drawn up. You may still hear in Kingston stories of a game between Queen's University and the Royal Military College, played on an open-air rink with a bandstand in the middle of it. Three-fourths of the excitement of the game came from the play around the bandstand when the players for a moment lost sight of one another and there was uncertainty as to the position of the puck! Nowadays the game is almost always played under cover, and often on rinks where the ice is artificially made.

Photo, The Pittaway Studio, Ottawa.
The Stanley cup is emblematic of the World's Championship in professional hockey, though originally presented in 1893 by the Earl of Derby for amateur competition.

The ice is kept as smooth as possible by being frozen in preparation for each game and by being scraped between the periods of play. The goal posts are 6 feet apart, 4 feet high, and have a goal net. The puck, a flat disk of vulcanized rubber 3 inches across and 1 inch deep, flies with such speed when shot that it would be impossible in many cases, were it not for the net, to tell whether a goal had been scored or no. The ice sheet is surrounded by a wooden wall about 5 feet high. This prevents players from getting charged out of the rink, and it greatly adds to the speed and the continuity of the game. A player coming down the ice will, when he is tackled, shoot the puck against the wood, from which it comes off at an angle like a billiard ball from the cushion of a table. Following up his shot, the player can often again secure the puck and continue his run; or a player shooting at goal may miss his mark, and still traveling, may catch the puck on the rebound from the back wall and put it into the net.

On each side there are six players, arranged generally one in goal, two on the defense and three forward. The game, however, changes at every moment, and therein lies its immense attraction. Except for the goal-keeper, who, clad in enormous pads, stays by his citadel, each player must be ready to take up any position. If a defense man has stopped a rush and has got possession of the puck, he will take it down the ice himself, while one of the forwards will drop back to fill his place on the defense. The game is played at immense speed, with the result that accidents, and fouls, however unintentional, are frequent.

There is nothing in sport more thrilling to watch than an attack by the forward line when the passing is good. The puck flashes from one to the other so swiftly as to make it hard to follow the play. The great object of the player with the puck is to keep control. The supple ash hockey sticks are fitted to shoot the puck almost with the speed of a bullet; but in a rush, however fast the pace, it is necessary that the puck should not get away, except when passed, from the player taking it down the ice. Should he shoot it ahead of him, it will be taken by one of the other side and returned past him before he can check himself. The object of the two players on the defense is to break up an attack, and this is often done by riding off the invader into one or other of the corners beside the goal.

The swiftness of the game and the opportunity for plays devised on the instant had a curious and unlooked-for result during the World War. The British

CURLING AND ICE HOCKEY

Curling with irons. The game is played indoors because of the great cold in winter. In the West stones are used in place of the irons.
Photo, Canadian Pacific Railway.

Photo, Wade Studio, Montreal.
Women students at McGill University playing hockey. This is one of the favorite recreations of both men and women students, and matches are arranged with other universities and clubs.

Air Force came to be made up mainly of Canadians, and it was noticed that hockey-players were among the most successful of the army fliers. Swiftness, rapid turning, planning for position were the very qualities required in that desperate game of the air, and the Canadians took a share in it greatly out of proportion to their numbers.

SKIING, BORROWED FROM NORTH EUROPE

Another great winter sport, but this one borrowed from another land, is skiing. This sport requires hilly country for its full exercise, and its popularity in Canada is thus confined to places where the natural advantages exist. A man wearing snowshoes walks, and his speed, at its greatest, seldom is beyond a walk. He can, however, run on snowshoes, and when your fathers were boys snowshoe-racing was a familiar sport. The ski, on the other hand, means, when worn by the expert, speed.

You have doubtless heard how Amundsen and his companions reached the South Pole on ski. The British expedition, under the gallant Captain Scott, tried to overcome the difficulties of the journey by elaborate equipment and motor sleds. The equipment, however, was always breaking down, and time was lost. Amundsen and his friends trusted entirely to their ski. Their dogs often towed them, and the journey was eased in this way, but it was the human factor that triumphed. These men were not intent on scientific exploration. They wanted to do something that had never before been done, and to do it before another party had succeeded in reaching the same goal. And so these Norwegians, accustomed to the use of ski from childhood, accomplished with comparative ease a journey that meant tragedy to others equal in bravery.

Ski are made of ash, oak or spruce, and are turned up for about a foot at the toe. The correct size is supposed to be the whole height of the wearer as he stands with his arm straight over his head. Ski are thus generally about seven and a half feet long. They are kept smooth on the under-surface and are attached to the heavy boots with harness made of leather. The runner generally carries a stick with a disk a few inches from its end, to prevent the stick from being thrust deep into the snow.

At the first venture these ski are the most independent and irresponsible things. They fairly run away with you. One foot goes in one direction and the other in another, and you finish by falling in the snow with your limbs in such a tangle that you need help before you are unwound. First attempts are generally made upon a gentle slope, where the speed will not be too great, but the real delight of the use of ski comes in the long trips across country, where the runners strive to use all the natural features of the land for their help.

Ski-jumping is a wonderful sport, both to take part in and to watch. The jumper starts at the top of a steep hill and travels at ever increasing speed down a prepared track till he comes to the take-off, where the path becomes horizontal and then again suddenly dips. The result is that the skier is shot off into the air with the speed of a railway train, and may travel a hundred feet or more before he resumes the slope. Landing at the end of such a jump is the most difficult part of the performance, and to fall in landing is counted by the judges as a failure in the jump. In the accompanying pictures you will notice the splendid and upright position of the jumper in the air. You will realize, too, how much courage is required where any mistake in balance would mean a serious fall. The record jump is over 130 feet.

But these feats are not merely athletic curiosities: they have their value in actual service. The ski is so largely used by soldiers in the highlands of Norway, Sweden and Switzerland that the men using them have to take the country as they find it. They may be compelled to jump, whether they will or no; or they may discover that the smooth slope down which they are traveling with ever increasing speed ends in a precipice, and they have to turn on the moment —to "telemark." Merely to throw themselves down would not stop them if the snow had any crust of ice upon it. They have to keep control of the situation by remaining on their feet, and they do this by the rapid swing which you see in the picture on page 3697.

So popular has this sport become in Canada that there are many thousands

SKI-JUMPING IN QUEBEC

Taking-off in the championship jump at Montreal. Notice the fine poise of the jumper, and the massed crowd at the sides and below. Photo, Chesterfield & McLaren, Montreal.

This jump is being taken in the ordinary course of travel across country. In competitions the jumper carries no sticks. Photo, Wade Studio, Montreal.

of members enrolled in the various ski clubs. The clubs have little shacks in the woods where members may cook a meal and spend the night.

ICE YACHTING ONCE WAS VERY POPULAR

Another great winter sport, not so popular now as it was some years ago, is ice yachting. An ice yacht is simply a frame upon three skates. A long backbone, which terminates in a skate serving as a rudder, has fastened across it a broad plank with a skate at each end. The mast is stepped where this crosspiece joins the backbone, and the rig is usually

Photo, Pringle & Booth.

A race between a bicycle and an ice yacht on Toronto Bay. Notice the man crouching on the outrigger to prevent the boat from upsetting.

mainsail and jib. On good ice with a strong wind a boat may travel as fast as a mile a minute. The crew, generally two in number, lie wrapped in the warmest of clothing on a flat platform near the stern. The boats are sailed on the ice in much the same way as a boat on water. When you are sailing a boat on water, however, you can tell when a squall is coming by the darker ripple to windward. In an ice yacht there is no warning. You feel the increased strength of the wind at the instant that the boat gathers speed.

This sport, like every other, has its times which call for great care. Every boy knows how on a large sheet of ice a line of current may force one piece of ice upon another. When a sleigh crawls across this ice ridge no damage is done, but if an ice boat going at thirty or forty miles an hour strikes such a fault, it may be thrown into the air and the crew may be pitched out on the ice. To check the boat all that is necessary is to run it head to wind. If the sails are then left loose and the rudder is turned square across the stern, the boat will stay in the one place.

Toronto harbor used to be a great place for the racing of ice boats, and it is to be hoped that so fine a sport may revive. It was killed, it is said, because rich men took it up and by introducing expensive improvements made success in racing impossible for those with little money. But a great deal of fun can be had from a boat that you can build yourself.

CURLING, INTRODUCED FROM SCOTLAND

Curling is another important game, and when you see men play it with tam-o'-shanter bonnets you will know where it came from. In Scotland, until within the last few years, the game was played always in the open air with round and polished blocks of granite weighing about forty pounds. They are fitted with a handle which enables a spin to be put on the stone at the moment of delivery. In Canada, where the climate is so severe, it is played generally in covered rinks, where the ice is kept at the finest possible smoothness. In Montreal and Quebec "granites" are little used, and "irons" weighing sixty pounds or more take their place. These irons "hold the ice"; that is, it is possible to get them to turn more across the rink than is the case with granites. The circles that you see on the rink form the "house," and the line that is drawn on the ice in front of the house is called the "hog-score." The stone must cross this line, otherwise it is dead and is taken off the rink. There is a great deal of skillful play in the building-up of a "head" and in the placing of stones to protect a good shot from the other side. But it is a Scot who is writing this article, and if he begins to tell all he knows about curling, the publishers will object. If, however, you have any cousins in the Old Country who write at Christmas time and say how cold it must be now in Canada, tell them that the sun is shining all the time and that you do not know what it is to have cold toes or chilblains.

If nothing has been said about skating, it is only because every Canadian boy lives on skates for some months yearly.

The Toll-gate, a painting by Kreighoff.

PAINTERS OF CANADA

CONTINUED FROM 3464

THE pioneers of the art of painting in Canada were officers of the army and navy. Topography, or the mapping of the natural and artificial features of a district, was an important part of the training in the schools of both the services, and among the officers thus educated were always to be found a few of especially artistic taste. Some of the museums and libraries of Canada, notably the John Ross Robertson collection in the Public Library, Toronto, contain many examples of the skill and fidelity of these non-professional artists. For example, in the above-mentioned collection will be found the following water-colors: A View of Lewisburg, North America, by Captain Ince, 35th Regiment, 1758; S. W. View of St. Johns, Quebec, by Jasper Peachey, Ensign 60th Regiment, 1776; Dartmouth Shore, Nova Scotia (from Halifax), by the Duke of Clarence (afterward William IV): this was painted on board H. M. S. Pegasus in 1786.

The painters of Canadian scenery were not exclusively naval and military men at this early date. Among them are to be found surveyors, architects, engineers and at least one clergyman, the Reverend William Grey. Each and all of these were faithful delineators of the scene before them, but there is very little in their work that could be thought of as purely æsthetic.

With the advent of the professional painter in Canada the character of the pictures changed. With the naval and military painters the mind of the artist was occupied mainly with the strategic and defensive features of the landscape. In the new era these considerations were ignored, but still the faithful delineation of the actual contours, outlines and other parts of the scene was largely maintained, or only modified a little according to the artistic traditions and conventions of the time. Among these modifications was a tendency, early in the nineteenth century, to introduce a tall brown tree resembling the Italian Stone Pine of Turner, or to throw a sombre shadow, generally brown, over the whole of the immediate foreground.

The first professional painter—with perhaps the exception of De Beaucourt, son of a military engineer under Frontenac—was Paul Kane, born in Muddy York (Toronto) in 1810. He devoted himself almost exclusively to depicting Indian life. He went to the western prairies in 1845 and spent about four years there, bringing back with him many portraits of Indian

chiefs, hunting scenes, war dances, and other works illustrating the habits and customs of the red man. From this material he published an illustrated book which is a valuable record of Indian life before 1850. The principal oil paintings executed by him were bought by the late Sir Edmund Osler and presented by him to the City of Toronto.

Daniel Fowler, born in England in 1810, arrived in Canada about 1840 and settled on Amherst Island, on the St. Lawrence, near Kingston. Here he painted many water-colors and made many pencil and pen-and-ink sketches of remarkable quality which were distinctively English in character. He showed a great facility in drawing and painting dead game, and these, with the farmyard scenes, often outlined with a pen and brown ink after the manner of Prout, are now accounted among the art treasures of the country and have considerable monetary value.

Painters of Picturesque Scenes and Water-Colors

A little before the middle of the century there arrived in Quebec one Kreighoff, who, born in Germany, had emigrated to the United States, whence he moved north to Canada's most picturesque province. He was immediately captivated by the pictorial aspect of men, houses and things in general. He delighted to paint the *habitants* in their picturesque winter dress—snowshoeing, skating, sleighing. Red and white blanket coats, with red and particolored sashes, toque caps and snowshoes, were all included by him in his historically valuable and humanly interesting genre pictures. With something of the satirical humor of Teniers he gave us scenes of revelry which have long since disappeared.

John Fraser, born in Scotland in 1838, first arrived in Toronto in the capacity of photographer, but his unquenchable love for painting kept him constantly busy with water-color landscapes. In this art he achieved a very high reputation, gaining eventually membership in one of the water-color societies of New York. The art of the photographer in the Fifties gave some scope for artistic skill, not only in the posing, lighting, draping, and so on, of his sitters, but in arranging groups recording some historical event of the time by a process of painting the hall, parliament chambers, church or other setting, and inserting cut-out photographs of the personages and then photographing the whole. Then there were elaborately stippled backgrounds, tinted photographs and miniatures. In Fraser's studio, away back, might be found working at backgrounds and so forth, Horatio Walker, Robert F. Gagen and F. McGillivray Knowles, each of whom has since achieved fame.

Another arrival from the old land was L. R. O'Brien, born in 1832, who reached a high level as a water-colorist and who in 1880 was made first president of the Royal Canadian Academy of Art, which was founded in that year by the Princess Louise and her husband, the then Marquis of Lorne. To O'Brien we are mainly indebted for starting a magazine entitled Picturesque Canada, which was the first effort to bring before the world at large a presentation of the beauties of a very picturesque country. Then followed Jacobi, a gifted Austrian landscapist and second president of the Royal Canadian Academy; Allan Edson; Harlow White; Theophile Hamel, who painted portraits of the Baldwin-Lafontaine government; Henry Sandham, a very clever illustrator who afterward went to London, where he died; J. Colin Forbes, an industrious but photographic portrait-painter who, like Berthon, has contributed, in spite of his shortcomings of style, valuable likenesses of eminent Canadians.

Study in Other Lands and the Founding of the Academy

In the Eighties, Canadian students began to study in Paris or in the United States; so that a more highly trained and technically equipped generation began to make itself felt. Blair Bruce, of Hamilton, and Paul Peel, of London, Ontario, while holding their own in the exhibitions of Europe, occasionally sent their pictures to Canada. Neither of these men, however, painted to any great extent in Canada, so that their work shows no trace of a national flavor. Paul Peel and Wyly Grier each gained a gold medal of the third class in the Salon of 1890.

We have spoken of the formation of the Royal Canadian Academy in 1880, but eight years previously the Ontario Society of Artists came into being. It has remained ever since the most united, energetic and deservedly popular of the art bodies of the country. Its function, however, is one that is limited to its own province.

This picture, Nut-gatherers in the Forest, is one of the landscapes of Homer Watson, an Ontario artist living at Doon, where he has painted in his own individual way, although influenced by his admiration for the English landscapist Constable and for the Barbizon group of French painters.

One of the older and best-known of the Canadian landscapists is T. Mower Martin, now over eighty. Like Harlow White, Edson, Matthews and most of the older men, his conception of landscape has been rather tamely topographical. Some of the younger men who came immediately before the extreme modernists did make some attempts to go beyond the actual photographic realities of the scene, but others avoided these experiments, and in their case, as in that of the photo-portraitists, we have to content ourselves with the historical value of their subjects and seek no further for values of beauty.

Robert Harris, of Montreal, was the third president of the Academy, and he is to be credited not only with a number of veracious portraits, but many which touched a high level of style, and, in the case of his portraits of Lady Minto and Mrs. Charles Porteous, of beauty.

PAINTERS IN VARIOUS FIELDS: LANDSCAPE, GENRE AND OTHER SUBJECTS

During all the changes of the artistic world in Canada there has remained, in the secluded village of Doon and removed from the art jargon of the studios, Homer Watson—frank admirer of Constable and the Barbizon landscapists of France. Working out his own salvation, he has pursued the even tenor of his very individual and independent way. And it is the way of dignified, rather abstract, thoughtful, solidly painted landscapes.

William Cruickshank will be recalled as a very familiar figure in the Ontario College of Art and in the lesser schools preceding it—a Scotsman with a biting tongue, a forcible but grim and sardonic humor; an erstwhile fellow-student with Sir Johnston Forbes-Robertson at the Royal Academy Schools in England in the Sixties.

Then there is Frederick Verner, who painted buffaloes in the Forties and is still painting them, in identically the same way, in the Fulham Road, London.

George A. Reid, fourth president of the Academy, was born in Ontario in 1860, and studied in Toronto, Philadelphia and Paris. He was mainly instrumental in establishing the Ontario College of Art. In his early days he painted scenes of rural life, such as Mortgaging the Homestead and The Foreclosure of the Mortgage. And among his most popular works were two representing boyhood. One was the interior of a hayloft with half a dozen urchins gathered in a circle listening to a tale being told by the story-teller of the party. The other represents three or four lads sitting, and one of them lying full length, on top of a sunlit brick wall. Of recent years Mr. Reid has devoted himself mainly to decorative panels, with an occasional landscape.

PAINTERS FAMILIARLY KNOWN IN OTHER LANDS

Horatio Walker, who is perhaps better known in the United States than in Canada, has long made his home in the Island of Orleans, whence came most of the subjects by which he gained his considerable reputation in Canada and the United States. His canvases deal with *habitants* of Quebec; oxen plowing, with the farmer's boy, stick in hand, urging them to right or left while the old man handles the plow. Sheep, calves, pigs, woodcutters, men cutting ice out of the frozen river—these are his themes; and they are all painted with truth, animation and a certain flavor of Barbizon.

The late Wyatt Eaton, born beside Lake Champlain in 1840, went first to Montreal and thence to New York, then to London and Paris. He established himself as a painter of portrait and figure subjects in the United States, but his latest works were the portraits of railway magnates, such as Lord Strathcona, Van Horne and Angus, in Canada.

William Brymner, who died in 1925, was a Montrealer and the fifth president of the Academy. He studied for several years in Paris, and is to be reckoned among those artists who have helped to remove the reproach that Canadian art is mainly landscape. His subjects include Quebec genre, classical nudes and draped figures, and among his portraits are some charming studies in water color, on a large scale, of boys and girls.

C. W. Jefferys was the first Canadian painter to convey adequately to the world the beauty of the prairies and river-flats of Manitoba. These landscapes placed him in the forefront of those painters who are distinctively Canadian in their themes; but long before his success as the painter of the limitless prairies he had established himself at the head of the workers in illustration. His great gifts in line drawing have clearly maintained his reputation, not only in Canada, but also in the

United States; and it may be interesting to our readers to learn that for some years he worked as an illustrator on The New York Herald.

One of the foremost Canadian portrait-painters is Edmund Wyly Grier, born in Australia in 1862, but a Canadian since 1876. His likenesses show true sympathy and understanding. These portraits include many of the most notable men and women of Canada. But he began his career as a painter of landscapes with figures, for which he gained his medal at the Salon, Paris. His portrait of Goldwin Smith is hung in the Bodleian Library, Oxford. The portrait of the late Liberal leader, the Honorable Edward Blake, in the Royal Academy in 1895, is now in Toronto University.

Portrait of Henry Cockshutt, as Lieutenant-Governor of Ontario, by E. Wyly Grier, R.C.A.

Horne Russell, now president of the Royal Canadian Academy, is a well-known portrait-painter, and is capable of a good marine or landscape. He has painted many prominent Canadians in Montreal and elsewhere.

Among decorative painters Frederick S. Challener ranks high. As colorist, draftsman and designer he is quite the most accomplished man Canada has for theatres and the decoration of hotels. His Death of Adonis, in the proscenium arch of the Royal Alexandra Theatre, Toronto, is good enough to compensate for a bad play; his single panel in the King Edward Hotel, Toronto, is the best of the many displayed there; and he has done, most successfully, a series of panels in a large private house in Oshawa.

Maurice Cullen paints those wintry conditions of Canada which the outside world is apt to suppose persist there all the year round. And he does his work in craftsmanlike fashion. His snow and ice are faithful transcripts of nature, but over and above their truthfulness to fact his works are instinct with poetry—with sentiment but not sentimentality.

Another very accomplished painter of winter scenes is Clarence Gagnon, who lives his life in the province of Quebec and paints the *habitants*, their sleighs, snow-covered cottages, their vivid sunsets, their mountain background, in a manner that makes his work among the most arresting in Canadian picture galleries.

A. Y. Jackson sometimes paints the same themes with a little preoccupation with, or sidelong glance at, the modern primitives; so that his cottages are more naïvely prehistoric than the fact, and his primitive sleighs more elemental than the first rude effort of the sled-builder. But his work is interesting and varied, and among the best is his output while living in Halifax.

Curtis Williamson began to be known as a painter of rather Dutch interiors, very sombre and Rembrandtesque, but of recent years he has done occasional portraits, of which the best-known is his presentment of Dr. Banting of insulin fame.

Robert F. Gagen, Canada's best-known marine-painter cannot remain long away from the sea, and his fresh and vigorous

canvases convey the foam and swirl of the waves as they hurl themselves on the coast of Maine or of Monhegan Island. McGillivray Knowles is another strong painter of the sea, and has recently varied this theme by introducing graceful figures bathing or, nymph-like, disporting themselves in the garb of nature. Mrs. Knowles has done very successful studies of the poultry yard in recent years, and these are sometimes executed on the scale of miniatures. Both of these artists are at present residing in New York.

Frank H. Johnston is one of the most original, daring and forceful of Canadian painters. A strong feeling for what is best in modernism pervades his work, and yet his appeal to the public has been such as to make him one of the most popular Canadian painters. He made many studies in the bleak wilderness of Northern Ontario, and wrung from this forbidding waste of rocks, pines and mountain torrents much of beauty and freshness. His sojourn in the "City of the Plains" (Winnipeg) gave him some new themes with lakes, woods and clouds, and his trip to the Rockies revealed him as a painter with an original point of view in the well-worn field of mountain scenery.

A Northern Night, by Frank H. Johnston.

Frederick S. Palmer is well known as a painter of animals and landscapes. His color is harmonious and often vivid. His cattle and sheep are more than mere accessories to a landscape: they are organically constructed and move naturally across the grazing field in the brilliant sunlight which he renders so well.

Frederick S. Haines, president of the Ontario Society of Artists, is another truthful delineator of animals, and he shows, too, a great love for trees, which he paints in a manner which makes them all recognizable to the botanist, yet with no sacrifice of artistic breadth or poetical vision.

Miss Gertrude des Clayes, an Englishwoman who settled some years ago in Montreal, shares with Laura Muntz (now Mrs. Muntz Lyall) the credit for being a sensitively artistic, bold, but withal charming painter of children. Of the two, Laura Muntz reaches a deeper note of mother-tenderness and sympathy, but Miss des Clayes conveys to us the true gaiety, freshness and innocence of childhood in a way never before attained in Canada.

Frederick Varley is well known as a painter of vigorous and decorative portraits, not of the intimate, but of the decorative kind; as a landscape-painter; and as an illustrator.

J. E. H. Macdonald is essentially a decorator. In former years he designed book-covers and worked in decorative commercial art with great success. Although one of the teachers in the Ontario College of Art, he finds time to paint typically Canadian landscapes. Formerly these were frankly realistic, but latterly his tendency has been to make a sort of landscape abstraction in conformity either with his sense of the decorative or with a modern convention, or both. Among his very promising early work there appeared a realistic but poetically

PAINTINGS BY CANADIAN ARTISTS

OXEN DRINKING, BY HORATIO WALKER

WESTERN SUNLIGHT, BY C. W. JEFFERYS, A.R.C.A.

CACHE RIVER IN THE LAURENTIANS, BY MAURICE G. CULLEN

WINTER, GEORGIAN BAY, BY A. Y. JACKSON, R.C.A.

QUEBEC VILLAGE STREET, WINTER, BY CLARENCE A. GAGNON, R.C.A.

THE SPIRIT OF MOTHERHOOD

MADONNA WITH ANGELS, BY LAURA MUNTZ

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conceived picture of a beaver-dam. The near end of this quaint structure—the evidence of that capacity for community toil on the part of this animal which is Canada's emblem—fronts the spectator, while the far end stretches, to the right, across the stream. A red canoe is partly run up on it from the still water above the dam. The lighting is that of a luminous gray day, and amid the varied colors of the surrounding woodland trees the gray bark of the poplars, cut by the teeth of the beaver to form their dam, makes a fine note of cool color tending to mauve and delicate violet. The artist at this period was on the high road to reveal Canada to the Canadians themselves, but some regret that his landscapes to-day are rather obvious conformations to theory.

Miss Mary Wrinch, now Mrs. George A. Reid, is one of the most original and forcible of Canadian landscapists. She is especially successful in her still pools and rivers, where reflection plays its magic part; and she is the most gifted painter of flowers, growing in the garden or in a tangled wilderness, that Canada possesses.

John, a portrait by Frederick Varley.

In Ottawa there is a group of good painters, of whom the best-known is Franklyn Brownell, who has recorded every varied beauty of the Gatineau, on which river the town is situated. And it is so placed that the Parliament buildings, which crown its greatest elevation, are reputed to have the finest site of any legislative assembly in the British dominions. Mr. Brownell was born in the United States, but has long been resident in Canada. He has painted the old market place of By-town (the ancient name for Ottawa), and has made many studies of the picturesque country folk with their sleighs, their fur coats and their snowshoe outfits.

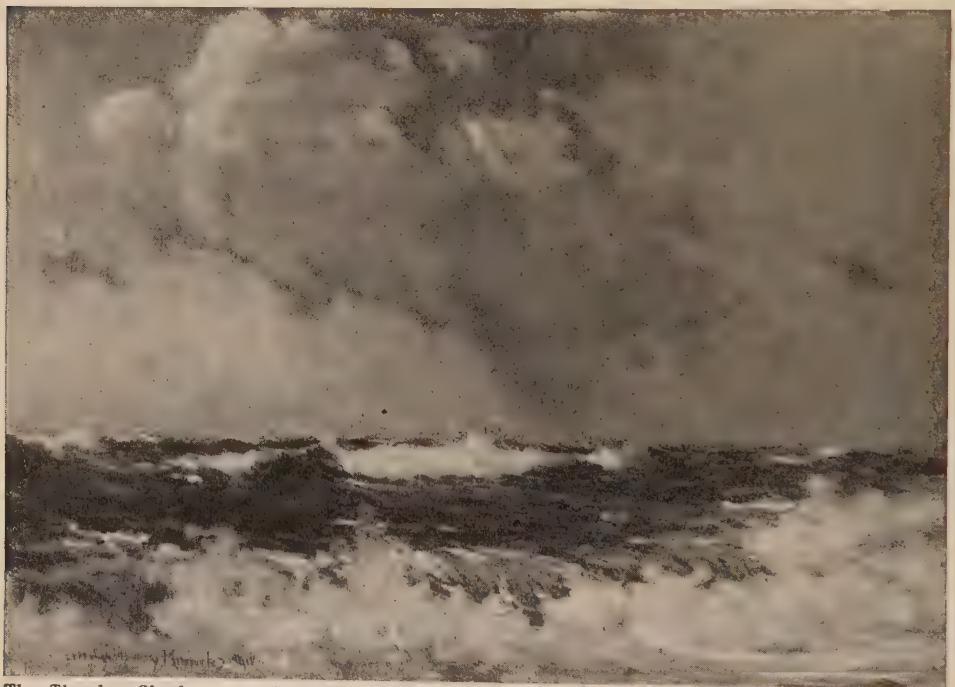
Ernest Fosberry, of Ottawa, is especially successful in his paintings of child life, and finds his models in his own home. One little girl with a very large bowknot tied in the ribbon in her hair is to be seen writing her lesson with her head on one side and just a suspicion of a protruding tongue.

Canada's one author-artist is Arthur Heming, whose Spirit Lake first introduced him to youthful Canadians as a writer of the dwellers of the woods, who had the additional gift of being able to draw his own illustrations. More recently he wrote a larger volume entitled The Drama of the Forest, which revealed the fact that here was a nature-writer who had really lived among the scenes which he described and illustrated. He is a past master in woodcraft, a teller of stories which appeal not only to youth, but to more mature lovers of the forest, and his work, both in narrative and drawing, is true to the facts of the theme in hand. He has just published his third important work, The Living Forest, in which his reputation is more than maintained, and in which his illustrations show a marked quality of originality.

Probably it is quite just to say that Arthur Heming is better known to the world beyond the border than any other Canadian artist.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 3873.

Early Morning, Lac Tremblant, by Maurice Galbraith Cullen, R.C.A. The snow, with its ever varying effects of light and color, holds out a sort of challenge to the artist, and many painters are giving their earnest study to reproducing its attractions. One of the most enthusiastic of these is Maurice Cullen.



The Thunder Cloud—sea and sky in a restless mood—by Farquhar McGillivray Knowles, R.C.A. Here you can feel the vigor of treatment which characterizes this painter's marines, fishing scenes and landscapes. He lived in Canada after 1862. His years of study were spent in Toronto and Philadelphia, then in England and France. Elizabeth McGillivray Knowles, wife of the artist, is also a painter of note.

THE LITTLE SPINNER AT THE WINDOW

WHY THE FINE SHAWLS COME FROM SHETLAND

CONTINUED FROM 3604

LONG ago, far away in the Shetland Islands, there once lived a little lame girl called Grete. Her home was built on the shore of a voe, or sea lake, that ran quite a distance inland. The house was of rough stones, and had only one window.

The roof was covered with green sods, with big white daisies and other flowers growing on it; wreathed, too, with ropes of seaweed, wound round stones, to prevent the sods from being blown off in high winds. There was no garden, but the ground was covered with white sand full of pink and white and yellow shells, for the green waves curled at its edge only a little way off.

There was a fire of peat in the middle of the only room, and as there was no chimney the smoke had to find its own way out, so the walls looked black and dismal. Then, a calf or some lambs, or even some little pigs, often shared the fireside in cold weather, and there was scarcely any furniture, for Grete and her mother were very, very poor. But they had a spinning-wheel and spun the sheep's wool into yarn, and knitted thick stockings and clothes for the fishermen.

On a sunny summer day the little island looked like fairyland, with other fairy islands shining in the distance; but Grete, who would sit at the window with her spinning-wheel and look out upon the island, knew it in winter storms as well, and was afraid then of the great sea which had caused her father's death and her own lameness. For poor little Grete could not run about and join in games. Often, for days, she had to lie on her back, bearing a cruel pain that sometimes brought tears to her eyes.

One day when the sea roared, and the spray struck against the small window, dimming it so that nothing could be seen through it, Grete, whose leg ached badly, was lying on the bed by the window.

For once the girl's busy fingers were idle as she watched a big spider who was beginning to spin his web in the corner of the window. When she first noticed him he was running a line from one corner to the other, then he went back to the middle, and made a line fast to another corner, and after making a sort of wheel with a lot of spokes all joining in the middle, he started to work rounds. How clever he was! And he went round so fast that he made her feel quite giddy.

The spider somehow seemed to grow bigger and bigger, and his web covered more and more of the window, and was getting as white as snow. Slowly he seemed to change, until he was no

longer a spider, but a troll, a queer little man with a face like a rosy dried-up apple. And the troll nodded his head at her, and said in a tiny voice: "Watch me, Grete, and you will know how to knit."

Yes, when she looked harder it was wool he was spinning, white and soft and fine; and the web—no, the knitting, of course, grew apace under his quick fingers. Why, it seemed quite easy to see how such beautiful patterns could be made. She was learning how to do it fast, and the little troll turned every now and then and smiled and nodded. The door opened. So did Grete's eyes. And now there was only a real spider, with an everyday sort of web, and, it was very odd, he was no longer at work, but was all tucked up into a ball against the ledge because he was too disgusted at the little beads of spray that were hanging on his web to go on with making it.

"Eh, mother," Grete cried, "you have frightened away the troll just as I was getting on so grandly with learning the fine knitting."

"What has the wee wifie been dreaming about?" said her mother. "Oh, I am tired!" And she sat down, not noticing in her fatigue that Grete did not answer. The little girl could not explain just then, and felt she wanted to think it over before she forgot the wonderful pattern.

She dreamed about it all night, and the next morning her mother helped her to pick out all the whitest wool from the bundles, so that she might start carding and spinning it at once. It would not spin fine enough to please her the first day; no, nor the second day; but she persevered until she was satisfied; and as her wheel went whirring round she fancied she heard the troll's voice saying: "Try again, Grete. Try again." She thought he was helping her all the time, for surely never had wool been spun of such fineness and evenness before. Then, too, the spider's web was there; and she had only to look at the window and the pattern seemed to stand out clearly again.

Before long the neighbors came to see the wonderful shawl that looked like lace.

A SHETLAND WOMAN KNITTING A SHAWL BY THE WAYSIDE
This picture is from a photograph by Charles Reid, Wishaw.

The fame of it even reached a great lady in Lerwick, who sent a messenger to bring it for her to see. Grete was sorry to part with her treasure, but her mother said it was a great honor for them, so it was borne away to Lerwick.

Then, one fine day, Grete saw a white sail making for the voe. Soon a lady was sitting beside her and asking her about her work so kindly that she quite forgot to be frightened. And when the lady left she gave Grete a gold piece for the shawl, the first gold piece that had ever been seen on the island. Everybody wanted to learn how to get gold pieces, and Grete was delighted to teach them. So better days came, not only for Grete and her mother, but for all the islands.

THE TALE OF JENNY MARTIN

JENNY MARTIN was the daughter of a poor woodcutter in the New Forest in the south of England. One midsummer eve she was wandering about the forest gathering flowers when she saw a little white mouse sleeping on some moss beneath a great oak tree.

"Oh, what a pretty white mouse!" said Jenny. "I will take it home."

She took the mouse in her hands, and it woke up and said: "No, Jenny, do not take me to your father's cottage or the cat may get at me and kill me. Leave me here. I am the Queen of the Mice, and I will reward you for your kindness."

"What will you give me, then?" said Jenny.

"Anything that you like to ask for," said the little white mouse. "You have only to come to this tree and tap three times and I will grant you what you wish."

"Well, to begin with," said Jenny, "I should like my father's cottage to be changed into a pretty farmhouse."

"That I have done," said the mouse, "as you will see when you return home."

Jenny put the little white mouse back on the moss beneath the oak tree, and ran home. In the place of the small, shabby cottage which she had left a few hours before, there stood a pretty farmhouse, with an orchard full of large fruit trees, a stable with three horses, and a cowshed with thirty cows; and there were plenty of ducks, geese and chickens in the yard. Oh, how happy Jenny was, and how amazed was her father, the poor woodcutter.

A manly young farmer who had always been in love with Jenny came that evening to ask her to marry him. But Jenny was now proud and disdainful, and she dismissed her old sweetheart. She began to feel sorry that she had not asked the Queen of the Mice for something more than a farmhouse. So she went to the tree, tapped three times, and said:

"Little white mouse! Little white mouse!
Jenny is tapping outside your house."

The little mouse peeped out and said: "Well, what do you want now, Jenny?"

"The farm is too small and dirty," said the girl. "I should like a fine, handsomely furnished manor-house with a crowd of servants, a coffer full of gold, and a heap of rich, beautiful dresses."

"Return home," said the mouse, "and there you will find all that you desire."

Jenny thus became a rich young lady, and as she was pretty as well as rich, the squire's son came to woo her, and all the neighbors looked forward to their marriage. But no marriage took place, for Jenny grew proud and disdainful.

"No squire's son for me!" she said. "I will get a castle and marry a lord."

So she went to the oak tree and tapped three times and said:

"Little white mouse! Little white mouse!
Jenny is tapping outside your house."

"Dear me! Dear me! Whatever do you want now?"

"I want to be a lady," said Jenny, "and live in a great castle."

"Very well," said the little white mouse. "Go home and you will find all that you desire."

So Jenny became a great lady, and a duke came and made a proposal of marriage to her. But Jenny was still proud and disdainful.

"A duchess?" she said. "I do not care to be a mere duchess; I must be a queen."

When she asked the little white mouse to change her castle into a royal palace and make her a queen, the little white mouse said: "Take care, Jenny, take care! You are getting very proud and disdainful. But go home, and, for the last time, you will there find all that you desire."

That very day the young and handsome King of England came to the New Forest to hunt.

As he was chasing the deer he saw a magnificent palace gleaming between the trees. He rode up to look at it just as Jenny returned from her visit to the little white mouse. The woodcutter's daughter was now clad in rich, trailing robes of marvelous colors. She no longer appeared merely a pretty girl but a very stately and beautiful lady. The king fell in love with her at first sight and asked her to be his queen.

Jenny was at last pleased and contented with her wonderful good fortune. As she watched the preparation which was being made for her marriage with the king she thought there was nothing left on earth for her to desire. Every day her royal lover came to her palace with splendid gifts; she had great ladies to wait upon her and great lords to attend

to her orders, and triumphal arches connected by festoons of foliage and flowers were erected all along the road from the New Forest to the City of Westminster, where the wedding was to take place. But as Jenny was about to enter into the royal state carriage she said to the king: "I have forgotten something. Wait a minute while I go into the forest."

The vast crowd of courtiers and knights and men-at-arms made way for her, and pulling up her long robe, she ran to the oak tree and tapped impatiently three

THE KING FELL IN LOVE WITH JENNY AT FIRST SIGHT AND ASKED HER TO BE HIS QUEEN

times, and said in a commanding voice:

"Little white mouse! Little white mouse!
The Queen of England has come to your house."

"Well, Jenny Martin," said the little white mouse in a severe tone, "are you still not satisfied, with all the wonderful things that I've done for you?"

"I want only one thing more," said Jenny. "When I am married I want my husband to give way to me in everything. Then I shall be ruler of England."

"You have no husband yet," said the white mouse, "and you will have to become a sweeter and more dutiful girl before you get one. Go home and profit by the lesson that is awaiting you there."

Jenny went back through the forest in a state of strange fear, for, as she looked at her dress, she saw that it had changed from a queenly raiment into the poor, plain attire of a peasant girl. The palace had disappeared, and the king and the multitude of lords and great ladies and glittering soldiers were gone. Only her father's humble cottage now stood beneath the trees, and, strange to say, when the woodcutter came home late that evening to supper, he spoke as though nothing marvelous had ever occurred.

"Was it only a dream?" Jenny kept saying to herself when she found that none of the neighbors laughed at her.

No doubt the kindly little mouse made it all appear to be only a dream in order to lighten Jenny's punishment. But Jenny learned the lesson. She became a sweet, contented, industrious girl, and the manly young farmer who had always loved her came and married her, and she lived more happily with him on that quiet little farm than she would ever have done on a high and glittering throne in a palace surrounded by courtiers.

EYES FRONT

BOB FRASER had a contract to supply a Cœur d'Alene silver mine in Idaho with cord wood that winter. At first he tried living in camp and journeying out to the wooded slopes of the Sawtooth Mountains every morning, but the winter days were short and time very precious, so he built himself a log shack in the valley immediately below where he was cutting. Thence it was an easy matter for a good skier to journey every day to his work, and when he needed stores he could go into the mining village.

The snow lay deep and firmly packed on the steep slopes and Bob enjoyed his skiing in the crisp air. Each night as he finished work he wiped the blade of his ax and stuck it into the trunk of a tree ready for use the next morning. Because of the severity of the winter game was scarce: the deer and elk had gone into lower country, and the few predatory animals of the region were very hungry—the only time when they are likely to be dangerous to man. Bob, as a good woodsman, was aware of this, but as the days passed and he saw and heard nothing, he relaxed his vigilance and left his rifle in the shack.

One morning, after an invigorating climb and run, he reached the place where he had left his ax the night before. As he topped the rise he saw a furry form between him and the tree where it stuck. A mountain-lion—and a big one, but lean and hungry-looking. Bob gave a shout and advanced, expecting the animal would retire as soon as he saw him. But it stayed, crouching—its yellow eyes blazing—and Bob saw that it was slowly lashing its tail, sure sign that it meant to spring. He measured the distance between himself and his ax, and in the brief time that he looked away the cougar crept nearer. It became evident that he could not afford to take his eyes off those blazing yellow ones. The rifle and the shack were away down the hill, and there was no way for the woodsman to reach them but by backing in his trail. It was his one chance, however, and he determined to risk it. He slowly backed, and at his first movement the muscles on the creature's shoulders rippled and he crept slowly after the man. Step by step and yard by yard, the cougar creeping after him, Bob backed along the trail as it twisted and turned on its downward grade. None but an expert could have performed such a feat, and Bob had not even a ski-pole to help him. Each time before shifting his weight he tested the tenuous grip of the skis upon the trail. He dared not look behind him, he could not even look down. He tried it once, and the lion gained several feet during the few seconds his eyes were turned away.

As he backed yard by yard nearer the cabin, through wooded hollows and over little ridges, such thoughts as he could spare from his immediate difficulties and the compelling glare of those wicked eyes, were busy with a new problem. All around his cabin the snow lay deep, ten feet and more. He had kept a clear cutting immediately round the cabin and a path through to the creek. But there was only one place where he had piled up steps against the snow wall. If he missed the steps, the cougar could spring full upon him.

When he knew that he was very close to the cabin he shot one flashing glance over his shoulder. In that time the cougar, getting anxious lest his prey escape him, by a short bound placed himself within easy leaping distance. Quickly Bob shuffled his feet out of the ski straps and then with desperate impetus flung himself down the snow slope, and fell through the door of the cabin. Immediately he was on his feet, his back to the door to meet the heavy impact of the cougar's spring. There was a strong bolt, and exerting all his strength, he shot it, and reached for his rifle. The cougar crept around the cabin to find another entrance. Bob had guessed that he would do this, and, as the beast passed the back, he fired through the window. It was only a ten yard range and the ball struck fair between the eyes. One leap into the air, one tremor through the lithe form, and the beast lay still, its days of slow starvation ended. The hide was seven feet long when Bob had stretched and cured it. It would have brought him a good price but he refused to sell it. He never went to or from his work again without his ax or his rifle on his shoulder, for he had learned the lesson of the woods—that eternal vigilance is the price of safety.

WHEN BETTY LOST HER WAY

BETTY at first thought she was still dreaming. She had cried herself to sleep among the ferns under an oak tree, but the sound of music had awakened her.

She wiped the tears from her eyes with her pinafore, so that she could see more clearly. The moon had risen, white and large, behind the great pines in the middle of the wood, and there, in the moonshine, was a band of little gray mice dancing and singing round the stump of a tree.

On the tree-stump stood a funny elf with a solemn face, playing music on a big fiddle, and three pretty fairies sat on the grass, watching the dancers.

Betty crept nearer and nearer, until she was able to hear that the mice were singing:

"All the corn is a golden brown.
Harvest home! Get the harvest home!
Apple and nut are tumbling down,
As we sing harvest home!

"Hurry up, farmer, and cut the wheat.
Harvest home! Get the harvest home!
Thresh out the grain for us to eat,
As we sing harvest home!

"'Corn,' says the farmer, 'is my own consarn.'
Harvest home! Get the harvest home!
But the wise little mouse knows the way to the barn,
As we sing harvest home!"

Then a mouse saw Betty and gave a shriek, and away scuttled all the dancers. But the tallest of the fairies—a beautiful lady with lovely lilac wings and long, flowing lilac robes—called the mice around her, and looked sternly at the little girl.

"How dare you disturb my mice when they are holding their harvest festival!" she cried. "How is it you are not in bed, Betty, when all the world is fast asleep?"

"Please, fairy, it's my birthday," said Betty, beginning to cry. "We were having a party at the farm, and some of the children were late. Daddy went to fetch them, and I—and I—"

"Never mind, Betty," said the Fairy Queen, taking the little girl in her arms. "You shall have a special birthday party here in the woods. Play the dance to fairyland, Grimiken."

Looking more solemn than ever, the elf put his chin on the top of his big fiddle, and waved his bow three times in the air, and began to play a swift, merry dance. There was a rustle of wings, and for a moment the moon was hidden by lovely fairy forms. Then down they flew to the tree-stump and clustered round their queen.

"Prepare a birthday feast for Betty of Westermain Farm!" cried the Fairy Queen. "She is five years old this very day, and has lost herself in our woods."

Away went all the fairies, and the little mice began to dance with joy. Holding each other's front paws, they circled round Betty, singing:

"Pretty little Betty is kind and sweet,
Pretty little Betty will do no harm
To the tiny gray mice with nimble feet
That live with her on her father's farm."

"Do they really?" said Betty.

"Yes," replied the Fairy Queen. "But there are only thirty-two of them, so they don't take much of your father's corn."

By this time the banquet had been prepared, and a rich and glorious banquet it was—hundreds of new sorts of cakes, and puddings and tarts, and sweets of every kind. Everything was served up on gold plates, and a bright-winged fairy brought Betty a golden goblet, and poured out a delicious fairy drink for her. Rows of tables, on which was placed all manner of exquisite fruit, were set on the grass, and a band of goblins played lilting tunes during the feast.

At last the feast was over, and the dancing began. The Fairy Queen took Betty as partner, and it was wonderful how quickly the little girl learned all the steps of the wild and maddening fairy dances. Round and round they whirled on the greensward. Suddenly a cock crowed in Westermain Farm, on the northern side of the wood.

"Quick, we have not a moment to lose!" cried the Fairy Queen, touching Betty with a little wand.

Betty swayed and fell asleep in the Fairy Queen's arms. When she woke up she found herself lying, with her clothes on, in her own little bed in the farm. Her father and mother, who had been searching for her all night, still think she managed to find her own way home.

And Betty never told them what really happened that night, because she feared her father would chase the friendly little gray mice out of the barn.

MARJORIE FLEMING

NO wonder is it that Sir Walter Scott loved Marjorie Fleming, remarkable child that she was. A Scotch friend of Sir Walter has written the story of their friendship. He tells how the great novelist, weary with writing, would throw down his pen, saying, "I am off the.fang!" which is the Scotch way of saying that the pump is dry. "I can make no thing of Waverley to-day; I'll awa' to Marjorie. Come wi' me, Maida, you thief." (On page 2627 you may see a picture of Sir Walter and his dog.)

Then the pair were off, Scott taking a plaid with him. "White as frosted plumcake, by jingo!" said he, when he got to the street. Maida gamboled and whisked among the snow, and his master strode across to the house he visited daily on such terms of intimacy that he had his own key.

When he and the hound had shaken themselves in the lobby, he would call out, "Marjorie! Marjorie! where are ye, my bonnie wee croodlin doo?" In a moment a bright, eager child of seven would be in his arms, all kisses.

"Come yer ways in, Wattie," would call an elderly voice. (Just imagine calling the great Sir Walter *Wattie!*)

"No, not now. I am going to take Marjorie wi' me, and you may come to your tea in Duncan Roy's sedan, and bring the bairn home in your lap."

"Take Marjorie, and it's on-ding o' snow!"

"Hout, awa', look here!" displaying the corner of his plaid, made to hold lambs, the true shepherd's plaid, consisting of two breadths sewed together, and uncut at one end, making a sack.

"Tak' yer lamb," she would say, laughing at the contrivance; and so the Pet was first well "happit" up, and then put, laughing silently, into the plaid, and the shepherd would stride off with his lamb, Maida gamboling through the snow and running races in her mirth.

And then into his own room with her, and out with the warm, rosy little wifie, who took it all with great composure! There the two remained for three or four hours, making the house ring with their laughter. When he had made the fire cheery, he would set her down in his ample chair, and standing sheepishly before her, begin to say his lesson. "Ziccotty, diccotty, dock, the mouse ran up the clock, the clock struck wan, down the mouse ran, ziccotty, diccotty, dock." This done repeatedly till she was pleased, she would give him his new lesson, gravely and slowly, timing it upon her small fingers—he saying it after her:

> "Wonery, twoery, tickery, seven;
> Alibi, crackaby, ten and eleven;
> Pin, pan, musky dan,
> Tweedle-um, twoddle-um,
> Twenty-wan; eerie, orie, ourie,
> You, are, out."

He pretended to great difficulty, and she would rebuke him with great gravity, treating him as a child. He used to say that when he came to "Alibi, crackaby" he broke down, and "Pin, pan, musky dan, Tweedle-um, twoddle-um" made him roar with laughter. Then she would become quite bitter in her displeasure at his ill-behavior and stupidity.

Then he read ballads to her in his own glorious way, the two getting wild with excitement over "Gil Morice" or the "Baron of Smailholm"; and he would take her on his knee, and make her repeat Constance's speeches to King John, till he swayed to and fro, sobbing. Fancy the gifted little creature, like one possessed, repeating

> "For I am sick, and capable of fears,
> Oppressed with wrong, and therefore full of fears;
> A widow, husbandless, subject to fears;
> A woman, naturally born to fears."

Or drawing herself up "to the height of her great argument,"

> "I will instruct my sorrows to be proud,
> For grief is proud, and makes his owner stout.
> Here I and sorrow sit."

Scott used to say that he was amazed at her power over him. "She's the most extraordinary bairn I ever met with, and her repeating of Shakespeare overpowers me as nothing else does."

Marjorie's sister Isabella, whom she worshiped, kept the letters and journals of the gifted child. In the first letter she ever wrote, addressed to her sister, she makes the amusing comment that a "simpliton says that my Aunt is beautifull which is intirely impossible for that is not her nature."

STORIES TOLD IN INDIA 3,000 YEARS AGO

These little stories were told to the boys and girls of India a thousand years before Jesus Christ was born, but they are still as interesting as when they were originally told to the children of long ago. They were first told in Sanskrit, the sacred language of the people of India.

THE TIGER AND THE TRAVELER

A TIGER who was too old to go hunting for his food lay hidden in the jungle, crying to the passers-by to come and receive a handsome bangle for nothing. A covetous fellow, hearing the invitation, asked to see the bangle, and the tiger pushed one of his paws a little way through the grass and showed the stripe upon it. Thereupon the covetous man started to get it, but soon found himself up to his waist in a pool of mud.

"One moment," said the tiger, "and I will come and help you out."

And, going into the pool, he seized the man and made a hearty meal of him.

Covetousness often leads a man into trouble and disaster.

THE APE AND THE WEDGE

IN Behar a great temple was being built, and a carpenter who had partly sawed through a huge beam of wood went away to dinner, leaving a wedge in the beam to prevent the two sawed parts from springing together.

While the man was away a party of monkeys came along, and one of these, thinking to appear clever before his companions, said: "See me take the wedge out of this beam and give the carpenter more work to do!"

Then he jumped down into the opening in the beam and tugged away at the wedge, until at last it came out, and at the same moment the sections of the beam sprang together and held the monkey fast until the carpenter returned.

Those who make trouble for others often fall into it themselves.

THE BRAHMAN AND THE GOAT

A BRAHMAN who lived in the forest had been to the town to buy a goat for sacrifice, and was returning with it on his shoulders, when he was seen by three rogues who determined to obtain his goat.

They ran ahead of him and seated themselves at the foot of three trees.

"Why do you carry that dog, master?" said the first, with well-feigned surprise. The dog, it must be understood, is regarded as unclean by the Brahmans.

"Dog!" was the indignant reply. "It is no dog at all, but a goat."

The Brahman came to the second rogue, who made the same remark. This time the Brahman took the goat from his shoulder, looked well at it, and replacing it, proceeded on his journey.

But when still a third man said the goat was a dog, the Brahman doubted the evidence of his own eyes, threw down the animal, washed himself from the pollution of the supposed dog, and hurried off home. The three rogues then seized their prey, and cooked and ate it.

Be on your guard against rogues.

THE BRAHMAN AND THE POTS

A BRAHMAN went to rest in a potter's workshop, taking with him his staff and a little dish containing some meal that had been given to him. As he lay upon the ground he began to meditate.

"If I sell this meal," he said, "I can buy some of these pots with the proceeds. Then I can sell those and make a profit, and with the money I can buy clothes to sell. And so, in time, I shall be worth many thousands of rupees. Then I shall buy a house and marry, and if my wives quarrel I shall take up my stick—like this, and punish them—thus."

As he thought these things he waved his staff, smashed his own dish, upset the meal in the dirt and dust, and broke many of the potter's vessels. So ended his wonderful castles built in the air.

Do not count your chickens before they are hatched.

THE LION AND THE CAT

AWAY in the mountains of the north of India lived a lion who was much annoyed by a small mouse that crept out while he was asleep and gnawed his mane. At last the lion went to the village and obtained a cat, promising to treat it royally if it would keep the mouse away.

This the cat did for a time, and the lion always gave his protector the best of food. But one day when the mouse was very hungry it came out and was killed by the cat. The lion soon found that there was no longer any mouse to annoy him, and he at once ceased supplying the cat with food.

The great are often selfish in their patronage of those who help them.

THE PEASANT AND THE THREE ROBBERS

A PEASANT was one day traveling to market upon his donkey, taking with him a goat that followed behind and was attached by a rope to the saddle of the ass. As the man went along the road three cunning robbers saw him.

"Here comes a fine fish for our net," said one. "I am going to take his goat without the simple fellow's knowing it."

"And I," said another of the thieves, "will do something cleverer than that. I will take his donkey with his permission, and he shall thank me sincerely for doing so."

"Ah!" said the third robber. "I will beat you both, for I will have the very coat off his back; and while he takes it off to give to me he shall call me his friend and benefactor."

"Come along," said all three at once. The first robber went up quietly behind the unsuspecting peasant, removed a bell that was tied to the goat's neck and fastened it to the donkey's tail, so that it might continue to tinkle and the poor man might think his goat was still following. The thief then loosed the rope from the goat's neck and made off with the animal. After a time the peasant happened to look round and was amazed to find that, though the bell still tinkled, the goat had disappeared. He ran hither and thither but could see no trace of his goat.

The first robber tied the bell to the tail.

Just then the second robber approached, and, on being questioned, replied: "I saw a man running in that direction with a goat, and I'll be bound to say it was yours. I will mind your donkey, if you like, while you give chase."

The peasant thanked the thief profusely and ran off, leaving his donkey with the rascal, who soon rode away upon its back.

The poor countryman, of course, found no trace of his goat, and soon returned, only to discover that his ass had disappeared too. He was very angry with the men who had robbed him and not less angry with himself for being duped.

"Well," said he, "the next man who tries to impose upon me will have to be very clever. I am on my guard now."

At this moment he heard a series of dismal groans, and going to the spot whence they proceeded, he found a man weeping bitterly and sitting upon the ground near a well, in the greatest distress. It was the third robber.

"Why are you making this noise?" said the peasant. "Do you think you are the only man in trouble? I am on my way to market and have just been robbed of both goat and donkey."

"Pooh!" replied the other. "That is nothing. I was carrying a casket of the richest jewels, and was resting by this well when by accident I let the treasure fall in, and there it lies at the bottom quite out of reach."

The peasant looked into the well, but it was too dark to see anything at all.

"Why do you not dive in and recover your treasure?" said he.

"Alas!" replied the robber, groaning: "I cannot swim or dive; but if only I could find someone who would dive in for me and get the casket, I would reward him with half its contents."

"Would you, indeed?" said the peasant. "Then I will dive in and get it for you."

The groaning man appeared delighted.

"You shall certainly have half of the jewels," he said; whereupon the peasant thanked him as the benefactor who would more than replace the loss of the goat and the ass.

Taking off his coat, the peasant dived in, but of course there was no treasure in the well; and when, after hunting for a long time in the water, he came out greatly disappointed, he found that the third robber had made off with his coat.

THE NEXT STORIES ARE ON PAGE 3829.

FIVE KINDS OF FLOWERLESS PLANTS

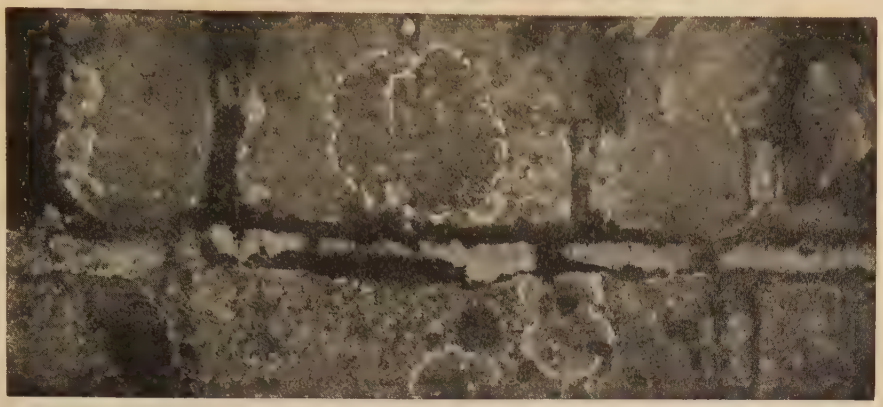
Lichens: Bearded Lichen. Liverwort Lichen. Daisy-flowered Cup Moss. Wall Lichen. Easter Lichen.

Liverworts: Common Liverwort. Dilated Liverwort. Conical Liverwort. Leafy Liverwort. Pear-shaped Scale Moss.

Mosses: Greater Water Moss. Common Hair Moss. Shining Hookeria. Blunt-leaved Bog Moss. Thyme Thread Moss.

Club-Mosses: Staghorn Moss. Marsh Club-Moss. Interrupted Club-Moss. Fir Club-Moss. Savin-leaved Club-Moss.

Horsetails: Great Horsetail. Variegated Rough Horsetail. Wood Horsetail. Great Rough Horsetail. Shore Horsetail.



Mosses and lichens on an old wall.

THE FLOWERLESS PLANTS

CONTINUED FROM 3664

THE plants we have so far been considering—the cereals, the fruits, the forage plants, the vegetables, the textile plants, the medicine and spice plants, and the grasses—are all flowering plants; they all belong to the most important division of the vegetable kingdom, the Phanerogams, or plants which produce flowers and seeds.

The word phanerogam comes from two Greek words meaning "evident marriage," and is a reference to the method by which the plants reproduce their kind. The other great division, the Cryptogams, a word meaning "hidden marriage," includes the plants that have no flowers and do not produce seeds. Since these names were given the reproductive methods of all kinds of plants have been more carefully studied by botanists. It would be true to say now that these operations of the simpler cryptogams are more evident than those of the more complex phanerogams.

There are three great groups of flowerless plants, the lowest comprising the algæ (seaweeds) and the fungi; the second the liverworts and mosses; and the third and highest includes the ferns, horsetails and club-mosses.

The first group is called by the rather hard name of *thallophytes*, because the plants in it consist of a thallus—a body having no division into stem and leaf. The group comprises the lowest and simplest forms of plant life. In some cases the plant has only a single cell. In the higher members there is considerable complexity. In every case the entire plant consists of a more or less uniform mass without the differences of tissue found in the various parts of a flowering plant.

Thallophytes reproduce their kind in various ways. Some of the lower forms simply divide. Each part develops into a new plant; but in the higher forms a special reproductive cell called a spore is produced, and this is capable of growing into a mature plant.

As we know, all life is believed to have begun originally somewhere in the water, and the more primitive of the two classes that make up the group are the algæ, which live in water or on damp earth or rocks and similar moist places. They are quite familiar to us, because their best-known representatives are the seaweeds. All seaweeds are algæ, though not all algæ are seaweeds, for the algæ are quite as common in fresh water as in the sea. Some of them grow even in hot springs, and wherever there are damp places

exposed to the light some members of this class are generally to be found.

Of course, many are so small as to be visible only through the microscope. On the other hand, we have among the algæ the tallest plants to be found anywhere on the earth. During the expedition of the Quest to the Southern Seas, seaweeds were found in the ocean at the southern tip of South America over six hundred feet long—greater than the giant sequoia trees of California, or the great eucalyptus trees of Australia. One of the enormous seaweeds is shown on page 880.

Anyone who visits the seacoast can see that seaweeds are of three distinct color groups—green, brown and red. The difference in structure generally agrees with this division. It is an interesting fact that the seaweeds can be classified scientifically according to color. This division is plain to the most unscientific person, because among flowering plants color has very little to do with the botanical grouping of the plants.

THE BROWN SEAWEEDS THAT PROTECT THE RED ONES

Though there are a few exceptions, the green seaweeds are found in abundance near the shore, where they are covered only at high tide. The brown forms grow mostly in the region between high and low tide, but here also certain of the red seaweeds are found, protected by the brown among which they flourish. Some vigorous forms of brown seaweeds thrive beyond the low-tide mark, and there too they often shelter the reds. In the deep waters the red seaweeds flourish, but below a depth of three hundred feet plant life is rare.

The green of the green seaweeds is due to chlorophyl, or "leaf-green," as we have called it, and if these plants are soaked in fresh water their green color still remains; but if the brown and red seaweeds are placed in fresh water for any length of time they lose their colors, which are due to pigments, and it is then seen that they also have green chlorophyl, which is simply concealed by the stronger colors. The brown and red coloring matters have a duty to perform. According to some botanists they act as light-filters and modify the sunlight shining upon them. This makes the grains of protoplasm containing chlorophyl more susceptible to those rays of light that best assist carbonization.

Each kind of seaweed is of a color that best suits the depth of water at which it lives. The fact already mentioned, that the brown seaweeds often protect the reds, is explained by the need which the deep-sea reds have of some protection when they grow in shallow waters. The browns between them and the sun act as parasols, and keep off the bright light. In the deep seas the greater thickness of water makes this protection unnecessary.

THE SEAWEEDS THAT GIVE FOOD TO MAN AND BEASTS

Seaweeds are very abundant, growing from Pole to Pole, in Arctic seas and in tropical waters. In the Arctic alone there are over 250 species, nearly 900 in West Indian waters, and about 1,200 in Australian seas. Anyone who begins to collect specimens of the seaweeds that grow round our coasts will be amazed at the number and variety, as well as the beauty, of the marine plants he finds.

Seaweeds have many uses. Some are eaten by man and beast, others are used for manure, and from others kelp is prepared for use in the manufacture of carbonate of soda and iodine. From Ceylon moss, an Eastern seaweed, is prepared agar-agar, or Japanese isinglass, which is used in the manufacture of jams and sweetmeats, and also in medicine. The way in which seaweeds reproduce their kind is shown on page 883.

The fungi are higher in the scale of life than seaweeds or any of the algæ, and already over 40,000 species have been distinguished. Several thousand grow in this country, and fresh species are constantly being added to the list. Their appearance and method of growth are so remarkable that ignorant people through the ages have regarded fungi with much superstition, and their growth has always been associated, in the popular mind, with fairies. We all know the familiar fairy rings, which are made up of numbers of toadstools of a species called the champignon, growing, not in groups like other fungi, but in circles.

THE MYSTERY OF THE FAIRY RING IN THE FIELDS

So regular and geometrical are these rings that it is not surprising that the superstitious and ignorant have thought they were planted by fairies. Science, however, has taught us better. The rings originate from a single fungus, which takes so much nourishment from the

ground immediately round it as to render the soil unsuitable for further reproduction of fungi. The spawn, however, spreads, and in the second year a crop of champignons is produced in a circle. Again the same thing happens, and so the circle is an ever-widening one. Another feature of the fairy ring that has added to the superstitious awe with which it is regarded is the exceptional greenness of the grass just inside the circle. This is due to the fact that the dead fungi have manured the soil and made it particularly suited to grass-growing. It is richer in this respect than the soil outside the ring.

THE SOFT FUNGUS THAT CAN LIFT A HEAVY PAVING-STONE

Although many of the fungi are tough and hard growths, like those found on the trunks of trees, the majority are very soft, and have an amazing power of growth. They will spring up in a night, and will, by their persistence, raise even a paving-stone if it is in the way. Yet a baby can crush the fungus with its foot.

We generally regard as the fungus the mushroom or toadstool that appears above ground, but this is really the reproductive or fruiting portion. Much of the vegetative portion of the plant is in the soil.

Many of our common fungi are highly poisonous, but, on the other hand, large numbers form excellent and nourishing foods. Of these, of course, the common mushroom is the best known, and truffles are regarded as one of the choicest. There are scores of edible fungi that should find a place in our menus. In fact about seven hundred sorts have been found to be edible, but some are not very good to the taste. Some of the best sorts are the common field mushroom, the meadow mushroom, the morels, the chantarelle, the beefsteak, or liver, mushroom and the oyster mushroom. The last two grow on trees. Other kinds are: fairy ring, the forest mushroom, the edible boletus, the variable russula, the bear's-head, the horse's tail, the coral, the clitocybe, inky caps, shaggy manes, and many others.

THE GIANT PUFF-BALL ON WHICH A FAMILY CAN BREAKFAST

One of the most delicious of these is the giant puff-ball, which cannot be mistaken for any other fungus as it is unique in being like a great football. If gathered fresh and cut into slices while still white, it can be fried with egg and breadcrumbs, and provides a breakfast for a whole family. Slices can even be cut from it day after day and the puff-ball left growing. But in gathering fungi for food great care must be taken not to confuse the poisonous with the edible species. We must never eat any that we cannot identify with absolute certainty. There is no general rule for telling the edible from the poisonous kinds. In Volume Fifteen you will find a special article on mushrooms, with some colored pictures.

These curious plants grow in all sorts of positions. Some are found on tree trunks, some under the ground, and others on damp walls. All have not the toadstool or mushroom form, for the fungi include the rusts and smuts that affect cereals, the mildews and molds found in damp rooms and on jams and cheese and other foods, and the yeasts, so useful in making good bread. While many are extremely useful to man, others, especially the smaller kinds, are great pests, and cause as much damage to crops as insect pests. In fact, it is safe to say that in countries like the United States and Canada millions of dollars are lost every year through fungus pests. The way in which the mushroom grows and propagates its kind is shown on page 1627, and the life-story of the rust and the potato disease, another fungus, are given on page 2617.

Perhaps the most striking fact about the fungi is that while many of them are very brilliantly colored, all are destitute of chlorophyl. They are, therefore, unable to manufacture the carbon compounds they need from the carbon dioxid of the air, and must obtain their carbonaceous food from organic material. That is why we find them growing on manure heaps, decaying vegetation, dead bodies, and the waste matter of plants and animals, or feeding upon living creatures.

CURIOUS PLANTS THAT USED TO PUZZLE THE BOTANIST

A lichen, as we have already seen on page 882, is not really an individual plant at all, but a partnership between an alga and a fungus, and the partnership is one of the most remarkable things in nature. The alga needs moisture and salts in solution and also protection, and these it obtains from the fungus; but it does not take them and give nothing in

return. The alga manufactures organic food by means of its chlorophyl, and supplies this to the fungus, so that, while neither can thrive alone naturally in the barren and desolate situations where they often flourish, together they are able to present one of the hardiest forms of plant life in existence. Both can, however, live if placed artificially in congenial circumstances. The fungus element is more important, and lichens are classed as fungi, and not as algæ.

How a Wrong Name Has Stuck to a Family of Plants

The second great division of the flowerless plants is the *bryophytes*, a name that means moss plants, and these include the liverworts and mosses. It is curious how a name, given in haste and quite inappropriate, can stick to a class. The liverworts were so named by an Italian botanist, Micheli, in the eighteenth century, because of a fancied likeness to a liver, and the name has continued though the majority of the liverworts have no resemblance whatever to a liver. There are about four thousand species in this class.

They live in moist places and do not thrive where there is a smoky atmosphere. They will generally be found growing on wet banks and rocks, on damp walls, and near waterfalls where the spray can fall upon them and keep them moist. Very often they are found growing with mosses. They have been well described as amphibious, for, while they mostly live on land, the male elements or sperms in them are furnished with two cilia, or hair-like attachments, to enable them to swim to the female part of the plant in order to fertilize the egg cells, and it is therefore necessary for the cilia to have sufficient water across which to ferry the sperm.

The Mosses John Ruskin Thought Were Creatures Full of Pity

The mosses are higher in rank than the liverworts, and are far more familiar, for even the most unobservant of us notices a moss-covered wall or rock, and many will remember Ruskin's unmeasured praise of the mosses, which he calls "meek creatures, the first mercy of the earth, visiting with hushed softness its dintless rocks; creatures full of pity, covering with strange and tender honor the scarred disgrace of ruin, laying quiet finger on the trembling stones to teach them rest." It is a beautiful description, but it is not altogether true botany, for the mosses are neither in simplicity of structure nor in the order in which they appear "the *first* mercy of the earth."

The highest group of flowerless plants is that which includes the ferns, the horsetails and the club-mosses. It goes by the name of the *pteridophytes*, which simply means "fern plants." Here we have a much higher type than the previous group. Whereas the liverworts and mosses have mere rhizoids, or hairs, serving as roots, the ferns and their allies have true roots, a proper system of vessels or ducts for the passage of water, and leaves as advanced in structure as many flowering plants.

The interesting life-story of a fern is told in pictures on page 1015 of this book, and need not be repeated here. Altogether over three thousand living species of ferns have been recorded by botanists, and in addition there are many extinct species. Indeed, the golden age of the fern family was in the past. They have, however, survived wonderfully through the geologic ages to the present time, far better than their allies the horsetails and the club-mosses, of which there are comparatively few survivors. Those plants thrived exceedingly in the forests of the Carboniferous Age.

The Horsetails That Men Use for Polishing Ivory

There are only about twenty-five species of horsetails now living. They all grow in damp places, such as marshes and bogs and moist woods; and, though they are found all over the world, they are more abundant in the temperate and colder regions of the northern hemisphere than elsewhere. The horsetails are of little use to man, but some species have a large quantity of silica in their stems, and on this account are used in polishing.

The club-mosses are most abundant in warm countries, but, like the horsetails, they are generally distributed all over the world, and there are altogether about a hundred species still existing. The common ground pine is a club-moss and so is the so-called resurrection plant. The spores of some species, known as lycopodium powder, are used for various purposes. Pills are coated with the powder, and it is used in making flash-lights for fireworks. The spores of certain species are of considerable medicinal value, and one kind is used as a dye.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 3905.

SOME NORTHERN FERNS

Although ferns do not produce flowers, they are exceedingly graceful and attractive, and their beauty is admired by all lovers of nature. Altogether it is estimated that there are more than four thousand kinds of ferns growing in the world. Here we give forty-five kinds that grow in the North.

1. Brittle Bladder Fern. 2. Hard Fern. 3. Tunbridge Filmy Fern. 4. Mountain Bladder. 5. Rigid Buckler Fern. 6. Oblong Woodsia. 7. Royal Fern. 8. Crested Buckler. 9. Marsh Buckler. 10. Male Fern. 11. Alpine Woodsia.

1. Alpine Polypody. 2. Mountain Polypody. 3. Annual Maidenhair. 4. Little Adder's Tongue. 5. Black Maidenhair Spleenwort. 6. Three-branched Polypody. 7. Hart's Tongue. 8. Soft Prickly Shield Fern. 9. Holy Fern. 10. Hard Prickly Shield Fern.

1. Lanceolate Spleenwort. 2. One-sided Filmy Fern. 3. Limestone Polypody. 4. Lady Fern. 5. Adder's Tongue. 6. Moonwort. 7. European Bristle Fern. 8. European Sea Spleenwort. 9. True Maidenhair. 10. Hay-scented Buckler Fern. 11. Common Polypody.

1. Forked Spleenwort. 2. Alpine Bladder Fern. 3. European Parsley Fern. 4. Green Spleenwort. 5. Alternate Spleenwort. 6. Mountain Buckler. 7. Rock Spleenwort. 8. Scaly Spleenwort. 9. Common Maidenhair Spleenwort. 10. Rue-leaved Spleenwort. 11. Prickly-toothed Buckler. 12. Broad Buckler. 13. Bracken.

Lower New York seen across the Hudson River.

DOES A PIECE OF IRON GET TIRED?

CONTINUED FROM 3581

WHEN we speak of anything getting tired, we naturally think of a living creature, such as ourselves. We know that when we are not tired, we can do certain things. When we are tired, some change has occurred inside our bodies that prevents us from doing those things. The proper word for this state is fatigue. Now, if we take a piece of steel, like a razor, which can do certain things, and if we overwork it—as we should say if we were talking of a horse—we may find that it will not cut as it used to do, however carefully we prepare its edge. Something has happened which prevents it from doing what it was able to do before. We may call this "getting tired," as we do in the similar case of ourselves.

The fatigue of metals, as it is called, is now a well-known fact. It may be of very great importance at times in the use of tools and machinery. But the fatigue of metals is also very interesting in another way, especially when we begin to learn how it depends on changes in the way in which the molecules of the steel are joined to each other. For it may be that, if we could learn fully about the causes of tiredness and the cures of tiredness in razors, and things like that, we might better understand fatigue in ourselves.

The fatigue of metals has an important bearing on their strength, and many experiments have been carried out to show that repeated pulling and releasing of a piece of metal tires the material and makes it more and more liable to break under the strain. In some of the experiments the strains took the form of pressure applied again and again in the same place, while in others it consisted of twisting and bending. In some cases the action had to be repeated several millions of times before the metal broke. In this the various pieces of metal acted very much like tired human beings. Some were able to bear the strain and stress much longer than others before they broke.

The condition of metals when fatigued has been carefully examined by means of high-powered microscopes, and these examinations teach us something of the reasons. When the metal is tired through strain, the crystalline grains of which the metal is made up change their shape, and are drawn out in the direction of the strain.

WHY DOES A LIGHT GO OUT IN WATER BUT FLARE UP IN GASOLINE?

Water is burned, or oxidized, hydrogen. Being already burned, it can be burned no more. When a light is dipped in water, it is deprived of the oxygen by which it is burning, just as a drowning man would be. There is a little oxygen dissolved in water—enough for fishes to burn, or breathe

by; but this is not enough to support a light. Perhaps it might be, but water is a very quick and good conductor of heat, and when a burning thing is plunged into water it rapidly loses heat and is lowered to a temperature at which it cannot burn.

But gasoline is a compound of carbon and hydrogen, each of which is very ready to combine with oxygen—that is, to burn—when it is made hot enough. A light put into it does this, and so the light flares up, because the gasoline starts burning. The products of its burning are water and carbon dioxid, and when the gasoline has been changed into these two substances, it can be burned no more.

WHY DO SMELLING-SALTS REVIVE US?

The feeling of faintness is usually due to weak action of the heart, with relaxation of the blood-vessels of the skin, lessening the blood supply to the brain. When the heart is working weakly, and the blood-vessels of the skin are relaxed, we can often stimulate the heart to stronger action and cause a contraction of the blood-vessels in the skin by sending messages to the brain from the skin and sense organs. Thus, a cold breeze blowing on the skin, or a loud noise, will often revive a fainting person.

It is in this way that smelling-salts revive us. The nerves in the nose are irritated and stimulated, and send a message to the brain which responds by whipping-up the heart and contracting the blood-vessels in the skin. The result is that the brain receives more blood, and the faint feeling passes away. It is mainly a question of blood supply to the brain, and a fainting person may be revived in the same way by lowering his head and raising his legs so as to give his brain more blood.

CAN WE SEE EVERYTHING WITH OUR EYES?

We may almost say that there are just two sorts of people in the world—the foolish, who think they see all there is to see, and the wise, who know that they don't. This applies to seeing with the eyes of our heads and to seeing with the eyes of our minds—which you mean when someone explains something to you, and you say: "Oh, I *see* now!"

One of the greatest and wisest men that ever lived said that the highest knowledge a man could have was to know that he knew nothing—nothing, that is, compared with all that there is to know. For this and other great sayings this wisest of men—his name was Socrates—was murdered by his fellow-citizens over two thousand years ago.

Even with actual seeing, and with the best and brightest eyes, we see only a little of what is there, and usually see only its surface. That is why *insight* is such a good word for wisdom: it means that the eyes of a man's mind "see into" a thing. Then our eyes see only certain kinds of light. There are other kinds *which are darkness to us*, yet we know that they can be seen by the eyes of ants, and also they can be seen by the lifeless eye of the camera, which has seen for us hundreds of thousands of stars that our eyes have never seen and never can see.

WHY DOES WATER NOT STAND STILL?

Water runs because it has no cohesion, or else very little. While all solids have a great deal of cohesion—without which they could not be solids—liquids have very much less. But liquids are by no means all the same. Liquid water has very much less cohesion than liquid sealing-wax or liquid gum, which, indeed, has so much cohesion, or "sticking together," that we appropriately call it "sticky." On the other hand, liquid alcohol or liquid air—did you know that air could be liquid like water?—has very much less cohesion even than liquid water. But there is a third state in which anything may be, and that is the state of a gas—like air in its ordinary state, like the water which comes out of our noses when we breathe, and like the gas we burn for light. Now, *the* thing which marks a gas is that it has no cohesion at all—it runs wherever it can. However big the space that it is in, the gas always fills it. It goes under doors, out at chimneys, and out at windows, and so on. It has no cohesion.

WHAT IS MEANT BY THE ZODIAC?

The word zodiac means "little animals," and the zodiac is a belt, 16 degrees wide, extending right round the sky and having as its middle line the great circle (the ecliptic) along which the sun appears to travel during the year.

In this belt are the apparent paths of the sun and moon, and leading planets. Formerly it was supposed that all planets

traveled within the confines of the zodiac, but since the discovery of the minor planets in the nineteenth century, it has been found that many wander a considerable distance beyond the zodiac and are on that account called ultra-zodiacal planets, which means beyond the zodiac planets.

The marking-off in the sky of the zodiac, and the division of the belt into twelve equal parts, each named after a leading constellation in it, was the beginning of astronomy. The star group, or constellation, which gives its name to any particular division, does not necessarily fill the whole of that space, and indeed a glance at any chart of the heavens in which the various constellations are marked off by lines will show that the divisions are by no means equal in size, as they are so often made for convenience in diagrams like that given on this page. The constellations of the zodiac occupy very unequal spaces. One way of remembering the twelve divisions, or the signs of the zodiac, as they are called, is by the old rhyme, which gives them in their right order, though rather clumsily:

The signs of the zodiac, with the date on which the sun enters each constellation.

The Ram, The Bull, the Heavenly Twins,
And next the Crab the Lion shines,
The Virgin, and the Scales;
The Scorpion, Archer, and He-goat,
The Man that has the Water-pot,
And Fish with shining scales.

No one can say who first marked out the zodiac and divided and named its twelve parts, but it was probably the work of Babylonian star-gazers 2,000 years before Jesus was born. As a rough-and-ready method of marking off the most important part of the heavens, so as to be able to define the positions of the sun and planets at any particular time, the idea of the zodiac was of great advantage; but now the signs are not much used, as the whole ecliptic, like any other circle, is divided into 360 degrees, beginning with the spring equinox, and following the direction of the sun's motion all round the 360 degrees. This gives an opportunity for really accurate calculations.

No one can say for certain how the zodiac received its names. Some think the ancients, looking up at the sky, fancied that the groups of stars outlined the forms of various familiar objects, but it is impossible for us to see these resemblances to-day. The stars, however, were perhaps in different positions thousands of years ago.

Another theory is that names were suggested by the seasons and their agricultural operations. The spring signs, the Ram, Bull and Twins, are supposed to mark the bringing forth of young by the flocks and herds; the Crab marks the time when the sun begins to go back toward the Equator, moving backward as the crab was supposed to do; the Lion symbolizes the fierceness of the summer sun; the Virgin, the Gleaner of Corn, represents the harvest; the Scales stand for the time when day and night, being of equal length, balanced each other; the Scorpion represents the presence of venomous reptiles in October; the Archer stands for the season of hunting; the Goat, which returns from the plains to the hills for food, suggests the return north of the sun after reaching his farthest south; the Water Carrier represents the winter rains; and the Fish stands for the fishing season. If it is a fact that the names were given 2,000 years before Christ, the constellations would not then have corresponded to the seasons indicated, and so we cannot be certain on the point.

WHY DO WE SOMETIMES FAINT AT VERY SUDDEN NEWS?

Fainting may be due to various causes, one of which is stoppage of the blood supply to certain parts of the brain, and this happens sometimes as the result of a

severe or sudden emotion. The result of such a shock to the mind is a sudden contraction of the blood-vessels, which causes the person to become suddenly pale or white by preventing the blood from reaching the head. When this happens, a person falls down in a faint. The falling-down is nature's attempt to put things right, because, when one is lying flat on the ground, it is easier for the blood to reach the brain than when one is standing upright. When people faint in this way, they should be allowed to lie flat, and the head should be kept low.

WHY DO FISH DIE IN A JAR OF WATER?

We are all apt to imagine that all that is necessary for the life of a fish is that it should be in water, but, as a matter of fact, this is not true. It is not the water which keeps the fish alive, but the oxygen in the water, without which no animal, fish or man, can live long. The only reason why fish can live in water better than other animals is that they have a special arrangement in their gills by means of which they can extract this gas from the water better than other animals can. But when a fish is placed in a jar of water it may use up all the oxygen that is in it, and when that is the case life is no longer possible. The fish, in fact, is drowned, just as much as a man would be under the water. This is the reason why, if we keep fish, we must change the water often in order to supply them with fresh oxygen, or else have green plants growing in the water.

ARE WE TALLER IN THE MORNING THAN AT NIGHT?

The difference between our height in the morning and at night must be very slight; but if we assume that we are a little taller in the morning the explanation is to be found in understanding exactly how our backbone is made. The backbone consists of a number of bones, or vertebræ, and between each bone there is a disk made of cartilage. The object of this disk is to lessen the shock that would otherwise be felt on moving. Now, after being in an upright position for many hours, it is possible that the weight of the body squeezes these disks somewhat and makes them a little flatter, so that the total height is slightly reduced. During the night we must suppose that they resume their natural thickness by elasticity, and so stretch the backbone to its full length. In that way we may be a little taller in the morning than at night.

WHY, WHEN I WAKE, DO I SEEM TO HAVE JUST GONE TO SLEEP?

When this happens, the reason is that all our notions of time and its passage come from our consciousness of what goes on in our waking hours. That is what gives us our idea of time; and so, when we are asleep and unconscious, time does not exist for us, and when we wake, it seems as if time is going on from where it left off at the last moment we remember before going to sleep.

Children sleep very deeply. If they did not, they could scarcely become grown up; but grown-ups often sleep so that, though they are not really awake, they have a sort of half-consciousness of things going on around them. When we have a night of this sort, it by no means seems to us that we have "only just shut our eyes." More often it seems as if the night had been ages long. An hour of deep sleep is worth more than a night of light sleep.

WHAT IS MEANT BY A HELIOGRAPH?

We could do nothing without the sun, for without him there would be no life; but everybody does not know how sunlight is made to carry messages. This picture makes it clear. It shows how the sun-telegraph is worked in places where there is no telephone and it is not convenient to carry wires. When the sun is shining, nothing is easier than to make him carry words. All we want is sunshine, a sun-telegraph—or a heliograph, as it is called—and a man with plenty of common sense.

The heliograph is shown in this picture with the sun in front of it, but, by means of a second mirror, it can be worked equally well with the sun behind. Note the little hole in the centre of the mirror, and also the upright rod in front shaped like a V. The operator looks through the small hole—really an unsilvered spot—in the centre of the mirror, and adjusts the angle until he can see the distant station through the V of the sighting-rod. He has now got his mirror into exact position, and knows that it throws the reflection of the sun's rays on to the mirror at the distant station.

The mirror in the picture is facing the direction of the middle line. The ray of light falling from the sun strikes the

mirror at a point from which it is reflected at an equal angle, as shown in the bottom line. The reflected ray passes through the V, and as long as the mirror is at this angle this ray will reach the desired point. The operator is shown pressing down a key. Nothing happens while he presses, but the moment he releases his finger the key springs back and the angle of the mirror is altered, so that the reflected ray no longer passes through the V, and therefore no longer reaches the distant station. We see now how communication is established, for if we can send a flash of light to a given point, and withdraw it as we please, we have something like a telegraph, because we can use the flashes as signs, and they can be read at the other end as if they were letters or words. What actually happens is that the operator presses down the key so as to send flashes corresponding with the Morse code. This code, made up of dots and dashes, is understood all the world over; it is the code used for telegraphy everywhere. For a dash the heliograph operator will make a long flash; for a dot he will make a short one.

A long flash and four dots represent, for example, the figure 6; and it is quite easy for an experienced operator to flash through the whole alphabet as easily as he speaks it. At the distant station there may, of course, be another mirror fixed, from which the distant operator can send replies. The heliograph is probably the simplest means of communication that can be adopted.

Tapping out a message by heliograph to a distant station.

WHAT AND WHERE IS THE SARGASSO SEA?

The Sargasso Sea is a part of the Atlantic Ocean which lies so still within

the swirling currents of the Gulf Stream that enormous quantities of seaweed have collected in little islands and patches, so vast in the aggregate that they cover an area almost as large as Europe. In his great voyage of discovery Columbus entered this sea, and it was he who gave it its name, calling it the Sea of Seaweed. It is about two million square miles in extent, and consists mainly of a seaweed called *Sargassum bucciferum* or Gulfweed. This weed is kept afloat on the surface by round air-cells on short stalks.

The Sargasso Sea is like an enormous garden full of ever multiplying weeds. Amid the masses of seaweed there are myriads of marine creatures—jellyfish, crabs, weird fishes—and also a great amount of wreckage, and sometimes derelict ships. Some say that there are still to be seen there old Spanish and Portuguese galleons of the sixteenth century, but this is probably romance rather than sober fact.

WHY DOES THE TIDE COME IN AND GO OUT?

We should think of the shore as if it were part of a saucer partly filled with water; then if the water is added to, the "tide" will rise. To raise the level of the water is to cover more of the saucer, and vice versa. And so we shall understand how the tide comes in and goes out at very different rates, apparently, in different places. In a dock, where the water is all heaped up and deep, it needs the addition of much water to make any difference that we can notice; the tide seems to rise slowly. But where the shore is very flat, then the added water—due to the pull of the moon, as we know—spreads itself out over a wide space, and we say that the tide comes in quickly. If you pour a tablespoonful of water into a vase with very steep sides, you do not cover much more of the sides of the vase with it; but if you pour the same amount of water on a flat table, of course it covers a lot of the table.

WHERE DOES A FLOWER GET ITS SMELL FROM?

The smell of flowers is due to special kinds of essences, or oils, which the plant makes within itself for its own purposes. Some of these are very much like each other, and, indeed, there is perhaps a very general kind of family resemblance between most of them, especially when they are made by plants that belong to the same family or order. Almost all the plants which make these oils seem to go to work on the same general principles, and the type of them is the oil which we usually call turpentine, and which is made by a special kind of plant.

This oil is really a very complicated compound of only two elements—carbon and hydrogen. This class of compounds is often called the *volatile* oils, for volatile simply means "flying." And this tells us that they very readily escape into the air and move about in it. Of course, if they did not do that, we should not be able to smell flowers by merely holding our noses near them. We find in these volatile oils some of the useful things that the plant world affords us. As they nearly all consist of carbon and hydrogen, and if they have oxygen in them, too, never have much, they could all be burned; but they are much too expensive to use for that purpose, since, after all, the sweetest- or strongest-smelling plant contains only a very tiny quantity of the oil. The real uses of these oils are, first, to provide us with the pleasant scents that we know; second, to keep off insects when they are troublesome in their desire to sting or bite us; and, third, to kill microbes.

IF WE SWING A ROPE, WHY DOES IT GO ON SWINGING?

The question might be: "Why does the rope *ever stop* swinging?" When we swing a rope something has happened in our muscles. A store of power, derived from our food, and before that from the sun, has been turned into motion, which is another form of power. By swinging the rope we pass the motion made in our muscles to the rope.

It is true that at the end of each swing the rope is still for a moment, just as a pendulum is in a clock. The motion of the rope has been turned into another form of energy—the energy of position, or power to fall; and then the rope, by falling, turns this energy back into motion again.

If we could set a rope swinging in a vacuum—a space emptied of air—and if it were hung so that no friction was possible, and if none of its motion were used up in doing anything to the shape and structure of the strands of the rope itself, it would have to swing forever.

THE NEXT WONDER QUESTIONS ARE ON PAGE 3839.

A MERRY OLD ENGLISH BALLAD

A NUMBER of old English ballads have already appeared in our pages, and the following is a further example of these very old and once extremely popular stories in rhyme. Its proper title is King John and the Abbot of Canterbury, but the tale which it tells is, of course, to be regarded entirely as fiction, as there are endless stories of a somewhat similar kind, in which three questions have to be answered, the last of the three seeming to be unanswerable. The way in which it is always possible to answer them serves to illustrate the resources of human ingenuity. The spelling of the words in this ballad has been modernized.

THE KING AND THE ABBOT

CONTINUED FROM 3646

AN ancient story I'll tell you anon
Of a notable prince, was called King John;
And he ruled England with main and with might,
For he did great wrong and maintained little right.

And I'll tell you a story so merry,
Concerning the Abbot of Canterbury;
How for his housekeeping and high renown,
They rode post for him to fair London town.

An hundred men, the King did hear say,
The Abbot kept in his house every day;
And fifty gold chains, without any doubt,
In velvet coats waited the Abbot about.

"How now, Father Abbot, I hear it of thee
Thou keepest a far better house than me;
And for thy housekeeping and high renown,
I fear thou work'st treason against my crown."

"My liege," quo' the Abbot, "I would it were known
I never spend nothing, but what is my own;
And I trust your Grace will do me no deer
For spending of my own true-gotten gear."

"Yes, yes, Father Abbot, thy fault it is high,
And now for the same thou needest must die;
For except thou canst answer me questions three,
Thy head shall be smitten from thy body.

"And first," quo' the King, "when I'm in this stead,
With my crown of gold so fair on my head,
Among all my liegemen so noble of birth,
Thou must tell me to one penny what I am worth.

"Secondly tell me, without any doubt,
How soon I may ride the whole world about.
And at the third question thou must not shrink,
But tell me here truly what I do think."

"Oh, these are hard questions for my shallow wit,
Nor I cannot answer your Grace as yet;
But if you will give me but three weeks' space,
I'll do my endeavour to answer your Grace."

"Now three weeks' space to thee I will give,
And that is the longest time thou hast to live;
For if thou dost not answer my questions three,
Thy lands and thy living are forfeit to me."

Away rode the Abbot all sad at that word,
And he rode to Cambridge, and Oxenford;
But never a doctor there was so wise,
That could with his learning an answer devise.

Then home rode the Abbot of comfort so cold,
And he met his shepherd a-going to fold:
"How now, my lord Abbot, you are welcome home;
What news do you bring us from good King John?"

"Sad news, sad news, shepherd, I must give,
That I have but three days more to live;
For if I do not answer him questions three,
My head will be smitten from my body.

"The first is to tell him there in that stead,
With his crown of gold so fair on his head,
Among all his liegemen so noble of birth,
To within one penny of what he is worth.

"The second, to tell him, without any doubt,
How soon he may ride this whole world about;
And at the third question I must not shrink,
But tell him there truly what he does think."

"Now cheer up, Sir Abbot, did you never hear yet
That a fool he may learn a wise man wit?
Lend me horses, and serving men, and your apparel,
And I'll ride to London to answer your quarrel.

"Nay, frown not, if it hath been told unto me,
I am like your Lordship, as ever may be;
And if you will but lend me your gown,
There is none shall know us at fair London town."

"Now horses and serving men thou shalt have,
With sumptuous array most gallant and brave;
With crozier, and mitre, and rochet, and cope,
Fit to appear 'fore our father the Pope."

"Now welcome, Sir Abbot," the King he did say,
"'Tis well thou'rt come back to keep thy day:
For and if thou canst answer my questions three,
Thy life and thy living both saved shall be.

"And first, when thou seest me here in this stead
With my crown of gold so fair on my head,
Among all my liegemen so noble of birth,
Tell me to one penny what I am worth."

"For thirty pence our Saviour was sold
Among the false Jews, as I have been told:
And twenty-nine is the worth of thee,
For I think thou art one penny worse than He."

The King he laughed, and swore by St. Rittel,
"I did not think I had been worth so little!
Now secondly, tell me, without any doubt,
How soon I may ride this whole world about."

"You must rise with the sun, and ride with the same,
Until the next morning he riseth again;
And then your Grace need not make any doubt,
But in twenty-four hours you'll ride it about."

The King he laughed, and swore by St. Jone,
"I did not think it could be done so soon!
Now, from the third question you must not shrink,
But tell me here truly what I do think."

"Yea, that shall I do, and make your Grace merry:
You think I'm the Abbot of Canterbury;
But I'm his poor shepherd, as plain you may see,
That am come to beg pardon for him and for me."

The King he laughed, and swore by the Mass,
"I'll make thee Lord Abbot this day in his place!"
"Now, nay, my liege, be not in such speed
For alack, I can neither write nor read."

"Four nobles a week, then, I will give thee,
For this merry jest thou hast shown unto me;
And tell the old Abbot, when thou comest home,
Thou hast brought him a pardon from good King John."

HOME THOUGHTS, FROM ABROAD

This poem by Robert Browning is full of the pathos of the Englishman dreaming in a foreign land of the lovely English spring.

OH, to be in England
Now that April's there,
And whoever wakes in England
Sees, some morning, unaware,
That the lowest boughs and the brushwood sheaf
Round the elm-tree bole are in tiny leaf,
While the chaffinch sings on the orchard bough
In England—now!

And after April, when May follows,
And the white-throat builds, and all the swallows!
Hark, where my blossomed pear-tree in the hedge
Leans to the field and scatters on the clover
Blossoms and dewdrops—at the bent spray's edge—
That's the wise thrush: he sings each song twice over,
Lest you should think he never could recapture
The first fine careless rapture!
And though the fields look rough with hoary dew,
All will be gay when noontide wakes anew
The buttercups, the little children's dower,
Far brighter than this gaudy melon-flower!

O CAPTAIN! MY CAPTAIN!

This poem by Walt Whitman is one of the finest tributes ever paid to Abraham Lincoln.

O CAPTAIN! my Captain! our fearful trip is done,
The ship has weathered every rack, the prize we sought is won,
The port is near, the bells I hear, the people all exulting,
While follow eyes the steady keel, the vessel grim and daring;
But, O heart! heart! heart!
O the bleeding drops of red,
Where on the deck my Captain lies,
Fallen cold and dead.

O Captain! my Captain! rise up and hear the bells;
Rise up—for you the flag is flung—for you the bugle trills,
For you bouquets and ribboned wreaths—for you the shores a-crowding,
For you they call, the swaying mass, their eager faces turning;
Here Captain! dear father!
This arm beneath your head!
It is some dream that on the deck
You've fallen cold and dead.

My Captain does not answer, his lips are pale and still,
My father does not feel my arm, he has no pulse nor will,
The ship is anchored safe and sound, its voyage closed and done,
From fearful trip the victor ship comes in with object won;
Exult, O shores, and ring, O bells!
But I, with mournful tread,
Walk the deck my Captain lies,
Fallen cold and dead.

TO TUSITALA IN VAILIMA

Tusitala, "Teller of Stories," was the name given by the islanders of Samoa to Robert Louis Stevenson when he spent the last four years and eight months of his life among them. Only three days before his death in that beautiful far-away island home of his there came to him from his dear friend in England, Edmund Gosse, this poem, reminding him how, twenty-four years earlier, they had sailed together the seas that washed the rugged Western Islands of the land where he longed to be. R. L. S., tale-teller, poet and essayist, was Scottish to the core. The search for health took him into exile in the loneliness of the mild-aired Pacific. Into this poem, so loyal and tender, are gathered echoes of the romance and heroism and tragedy of one of the rarest men of genius in the annals of literature.

CLEAREST voice in Britain's chorus,
Tusitala!
Years ago, years four-and-twenty,
Gray the cloud-land drifted o'er us,
When these ears first heard you talking,
When these eyes first saw you smiling.
Years of famine, years of plenty,
Years of beckoning and beguiling,
Years of yielding, shifting, baulking,
When the good ship *Clansman* bore us
Round the spits of Tobermory,
Glens of Voulin like a vision,
Crags of Knoidart, huge and hoary,
We had laughed in light derision
Had they told us, told the daring,
Tusitala,
What the years' pale hands were bearing,
Years in stately, dim division.

Now the skies are pure above you,
Tusitala;
Feathered trees bow down to love you;
Perfumed winds from shining waters
Stir the sanguine-leaved hibiscus
That your kingdom's dusk-eyed daughters
Weave about their shining tresses;
Dew-fed guavas drop their viscous
Honey at the sun's caresses
Where eternal summer blesses
Your ethereal musky highlands,
Ah! but does your heart remember,
Tusitala,
Westward in our Scotch September,
Blue against the pale sun's ember,
That low rim of faint long islands,
Barren granite-snouted nesses,
Plunging in the dulled Atlantic,
Where beyond Tiree one guesses
At the full tide, loud and frantic?

By strange pathways God hath brought you,
Tusitala,
In strange webs of fortune caught you,
Led you by strange moods and measures
To this paradise of pleasures!
And the bodyguard that sought you
To conduct you home to glory,
Dark the oriflammes they carried,
In the mist their cohort tarried,
They were Languor, Pain, and Sorrow,
Tusitala!
Scarcely we endured their story
Trailing on from morn to morrow,
Such the devious road they led you,
Such the error, such the vastness,
Such the cloud that overspread you,
Under exile bowed and banished,
Lost, like Moses in the fastness,
Till we almost deemed you vanished.

Vanished, ay, that's still the trouble,
Tusitala!
Though your tropic isle rejoices,
'Tis to us an isle of Voices
Hollow like the elfin double
Cry of disembodied echoes,
Or an owlet's wicked laughter,
Or the cold and hornèd gecko's
Croaking from a ruined rafter,
Voices these of things existing,
Yet incessantly resisting,
Eyes and hands that follow after;
You are circled, as by magic,
In a surf-built palmy bubble,
Tusitala;
Fate hath chosen, but the choice is
Half delectable, half tragic,
For we hear you speak, like Moses,
And we greet you back, enchanted,
But reply's no sooner granted
Than the rifted cloud-land closes.

THE HEAVENS IN LONDON TOWN

This poem by Edward Shillito, the well-known Congregational minister, takes us back to the nights when under the terrors of war from the skies the lights of London were darkened or put out. Then the stars reappeared in London's midnight sky, and the poet felt he was seeing London canopied by night as Alfred, Raleigh, Shakespeare, Wesley and Keats had seen it. So he treasured the memory of their companionship in the gloom against the coming nights when once more London's glare of lights would shine forth and obscure the deep peace of the stars.

BEFORE the winter's haunted nights are o'er
I thankfully rejoice that stars look down
Above the darkened streets, and I adore
The Heavens in London Town.

The Heavens beneath which Alfred stood when he
Built ramparts by the tide against his foes,
The skies men loved when in eternity
The dream-like Abbey rose.

The Heavens whose glory has not known increase
Since Raleigh swaggered home by lantern-light,
And Shakespeare, looking upwards, knew the peace,
The cool, deep peace of night.

Under those Heavens brave Wesley rose betimes
To preach ere daybreak to the tender soul;
And in the heart of Keats the starry rhymes
Rolled, and for ever roll.

I, too, have walked with them the heavenly ways,
Tracing the sweet embroideries of the sky,
And I shall not forget when arcs shall blaze,
And all the lights are high.

THE RETURN OF THE GOLD-FINCHES

All lovers of wild garden birds will feel the sympathetic beauty of this address, by Sylvia Lynd, to the goldfinches which have been kind enough to build in her garden. This poem is from Mrs. Lynd's book The Goldfinches, published by R. Cobden Sanderson.

WE are much honoured by your choice,
O golden birds of silver voice,
That in our garden you should find
A pleasaunce to your mind,

The painted pear of all our trees,
The south slope towards the gooseberries,
Where all day long the sun is warm,
Combining use with charm.

Did the pink tulips take your eye?
Or Breach's barn, secure and high,
To guard you from some chance mishap
Of gales through Shoreham gap?

First you were spied a flighting pair,
Flashing and fluting here and there,
Until in stealth the nest was made
And graciously you stayed.

Now when I pause beneath your tree
An anxious head peeps down at me,
A crimson jewel in its crown,
I looking up, you down.

I wonder if my stripey shawl
Seems pleasant in your eyes at all.
I can assure you that your wings
Are most delightful things.

Sweet birds, I pray, be not severe,
Do not deplore our presence here,
We cannot all be goldfinches
In such a world as this.

The shaded lawn, the bordered flowers,
We'll call them yours instead of ours,
The pinks and the acacia tree
Shall own your sovereignty.

And, if you let us, we will prove
Our lowly and obsequious love,
And when your little grey-pates hatch
We'll help you to keep watch.

No prowling stranger cats shall come
About your high celestial home;
With dangerous sounds we'll chase them hence
And ask no recompense.

And he, the Ethiope of our house,
Slayer of beetle and of mouse,
Huge, lazy, fond, whom we love well—
Peter shall wear a bell.

Believe me, birds, you need not fear,
No cages or limed twigs are here.
We only ask to live with you
In this green garden too.

And when in other shining summers
Our place is taken by newcomers,
We'll leave them with the house and hill
The goldfinches' good will.

Your dainty flights, your painted coats,
The silver mist that is your notes,
And all your sweet caressing ways,
Shall decorate their days.

And never will the thought of spring
Visit our minds, but a gold wing
Will flash among the green and blue,
And we'll remember you.

BEFORE ACTION

Here is one of the finest poems brought by the World War from men who wrote what they intensely felt among its dangers. William Noel Hodgson, the writer, was the son of the Bishop of Ipswich. He was a fine soldier and athlete at school and college. This prayer-poem, with its love of the beauty of earth, resigned with only a sigh, was written four days before the writer fell in the advance on the Somme.

BY all the glories of the day
And the cool evening's benison,
By that last sunset touch that lay
Upon the hills when day was done,
By beauty lavishly outpoured
And blessings carelessly received,
By all the days that I have lived,
Make me a soldier, Lord.

By all of all man's hopes and fears,
And all the wonders poets sing,
The laughter of unclouded years,
And every sad and lovely thing;
By the romantic ages stored
With high endeavour that was his,
By all his mad catastrophes,
Make me a man, O Lord.

I, that on my familiar hill
Saw with uncomprehending eyes
A hundred of Thy sunsets spill
Their fresh and sanguine sacrifice,
Ere the sun swings his noonday sword
Must say goodbye to all of this;
By all delights that I shall miss,
Help me to die, O Lord.

THE BLAME

Many people shirk blame that is their very own. Not so that firmly thoughtful Victorian poet John Addington Symonds. In these verses he braces us to face the fact that we are responsible for whatever we may do.

BLAME not the times in which we live,
Nor Fortune frail and fugitive;
Blame not thy parents, nor the rule
Of vice or wrong once learned at school;
But blame thyself, O man!

Although both heaven and earth combined
To mould thy flesh and form thy mind,
Though every thought, word, action, will,
Was framed by powers beyond thee, still
Thou art thyself, O man!

And self to take or leave is free,
Feeling its own sufficiency:
In spite of science, spite of fate,
The judge within thee soon or late
Will blame but thee, O man!

PRAYERS

This consecration in prayer to the highest service of which the human spirit is capable is from the pen of Canon H.C. Beeching. The joy of youth, the strength of manhood, and the wisdom of faith of later years are offered back to God, who gave them all.

GOD who created me
  Nimble and light of limb,
In three elements free,
  To run, to ride, to swim:
Not when the sense is dim,
  But now from the heart of joy,
I would remember Him:
  Take the thanks of a boy.

Jesu, King and Lord,
  Whose are my foes to fight,
Gird me with Thy sword,
  Swift and sharp and bright.
Thee would I serve if I might;
  And conquer if I can,
From day-dawn till night,
  Take the strength of a man.

Spirit of Love and Truth,
  Breathing in grosser clay,
The light and flame of youth,
  Delight of men in the fray,
Wisdom in strength's decay;
  From pain, strife, wrong to be free,
This best gift I pray,
  Take my spirit to Thee.

ANGELS HOLY, HIGH AND LOWLY

The beautiful biblical thought that all Creation hymns the praise of its Creator is put in this sacred song with freshness of expression and musical rhythm by Professor Stuart Blackie. The professor, who lived from 1809 to 1895, was a notable and picturesque figure in the Scotland of his day.

ANGELS holy,
  High and lowly,
Sing the praises of the Lord!
Earth and sky, all living Nature,
Man, the stamp of thy Creator,
  Praise ye, praise ye, God the Lord!

  Sun and Moon bright,
  Night and moonlight,
Starry temples azure-floored;
Cloud and rain, and wild winds' madness,
Sons of God that shout for gladness,
  Praise ye, praise ye, God the Lord!

  Ocean hoary,
  Tell His glory,
Cliffs, where tumbling seas have roared!
Pulse of waters, blithely beating,
Wave advancing, wave retreating,
  Praise ye, praise ye, God the Lord!

  Rock and high land,
  Wood and island,
Crag, where eagle's pride hath soared;
Mighty mountains, purple-breasted,
Peaks cloud-cleaving, snowy-crested,
  Praise ye, praise ye, God the Lord!

THE CHARCOAL-BURNER

This most delightful study of an old charcoal-burner, attuned by long wont to his woodland surroundings, is from the graceful pen of the English poet and critic Edmund Gosse, whom literary people of the twentieth century regard with affectionate admiration.

HE lives within the hollow wood,
  From one clear dell he seldom ranges;
His daily toil in solitude
  Revolves, but never changes.

A still old man, with grizzled beard,
  Grey eye, bent shape, and smoke-tanned features,
His quiet footstep is not feared
  By shyest woodland creatures.

I love to watch the pale blue spire
  His scented labour builds above it;
I track the woodland by his fire,
  And, seen afar, I love it.

It seems among the serious trees
  The emblem of a living pleasure,
It animates the silences
  As with a tuneful measure.

And dream not that such humdrum ways
  Fold naught of Nature's charm around him;
The mystery of soundless days
  Hath sought for him and found him.

He hides within his simple brain
  An instinct innocent and holy,
The music of a wood-bird's strain,
  Nor blithe, nor melancholy,

But hung upon the calm content
  Of wholesome leaf and bough and blossom:
An unecstatic ravishment
  Born in a rustic bosom.

He knows the moods of forest things,
  He feels, in his own speechless fashion,
For helpless forms of fur and wings
  A mild paternal passion.

Within his horny hand he holds
  The warm brood of the ruddy squirrel;
Their bushy mother storms and scolds,
  But knows no sense of peril.

The dormouse shares his crumb of cheese,
  His homeward trudge the rabbits follow;
He finds, in angles of the trees,
  The cup-nest of the swallow.

And through this sympathy, perchance,
  The beating heart of life he reaches
Far more than we who idly dance
  An hour beneath the beeches.

Our science and our empty pride,
  Our busy dream of introspection,
To God seem vain and poor beside
  This dumb, sincere reflection.

Yet he will die unsought, unknown,
  A nameless headstone stand above him,
And the vast woodland, vague and lone,
  Be all that's left to love him.

INTO THE WOODS MY MASTER WENT*

This tender suggestion of close sympathy between Jesus and Nature is by Sidney Lanier, an American poet of high promise who died when comparatively young.

INTO the woods my Master went,
Clean forspent, forspent.
Into the woods my Master came,
Forspent with love and shame.
But the olives they were not blind to Him;
The little gray leaves were kind to Him;
The thorn-tree had a mind to Him,
When into the woods He came.

Out of the woods my Master went,
And He was well content.
Out of the woods my Master came,
Content with death and shame.
When Death and Shame would woo Him last,
From under the trees they drew Him last:
'Twas on a tree they slew Him—last
When out of the woods He came.

MY WILL

This delightful picture of English country life is from the charming pen of Arthur Christopher Benson, son of an Archbishop of Canterbury and himself Master of Magdalene College, Cambridge.

I WOULD live, if I had my will,
In an old stone grange on a Yorkshire hill,
Ivy-encircled, lichen-streaked,
Low and mullioned, gable-peaked,
With a velvet lawn, and a hedge of yew,
An apple orchard to saunter through,
Hyacinth-scented in spring's clear prime,
And rich with roses in summer-time,
And a waft of heather over the hill,
Had I my will.

Over the tree-tops, grave and brown,
Slants the back of a breezy down;
Through my fields, by the covert edge,
A swift stream splashes from ledge to ledge,
On to the hamlet, scattered, gray,
Where folk live leisurely day by day;
The same old faces about my walks;
Smiling welcomes and simple talks;
Innocent stories of Jack and Jill;
Had I my will.

How my thrushes should pipe ere noon,
Young birds learning the old birds' tune!
Casements wide, when the eve is fair,
To drink the scents of the moonlit air.
Over the valley I'd see the lights
Of the lone-hill farms, on the upland heights;
And hear, when the night is alert with rain,
The steady pulse of the labouring train,
With the measured gush of the merry rill,
Had I my will.

Then in the winter, when gusts pipe thin,
By a clear fire would I sit within,
Warm and dry in the ingle nook,
Reading at ease in a good, grave book;
Under the lamp, as I sideways bend,
I'd scan the face of my well-loved friend;
Writing my verses with careless speed,
One, at least, would be pleased to read;
Thus sweet leisure my days should fill
Had I my will.

Then when the last guest steps to my side—
May it be summer, the windows wide—
I would smile as the parson prayed,
Smile to think I was once afraid;
Death should beckon me, take my hand,
Smile at the door of the silent land;
Then the slumber, how good to sleep
Under the grass where the shadows creep,
Where the headstones slant on the wind-swept hill!
I shall have my will!

THE DESERTED HOUSE

Tennyson here reads us a little lesson in life and immortality. The deserted house may be likened to the earthly body of man when death has taken possession of it and the soul has gone away to live "in a mansion incorruptible."

LIFE and Thought have gone away
Side by side,
Leaving door and windows wide:
Careless tenants they!

All within is dark as night:
In the windows is no light;
And no murmur at the door,
So frequent on its hinge before.

Close the door, the shutters close,
Or thro' the windows we shall see
The nakedness and vacancy
Of the dark, deserted house.

Come away. No more of mirth
Is here, or merry-making sound.
The house was builded of the earth,
And shall fall again to ground.

Come away—for Life and Thought
Here no longer dwell;
But in a city glorious—
A great and distant city—have bought
A mansion incorruptible.
Would they could have stay'd with us!

SOMETIMES

Are we the men we might have been? That is a solemn question which all grown-ups may wisely ask. In these lines Thomas S. Jones, the American poet, asks it very daintily.

ACROSS the fields of yesterday
He sometimes comes to me,
A little lad just back from play,—
The lad I used to be.

And yet he smiles so wistfully
Once he has crept within,
I wonder if he hopes to see
The man I might have been?

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THE IRISH HARPER

Thomas Campbell has in these favorite verses given us a pathetic and beautiful picture of the faithful friendship of a dog for his poor but kind master. It is no wonder that poets delight to praise the dog, whose friendship for its master is never affected by the worldly position of the latter.

ON the green banks of Shannon, when Sheelah was nigh,
No blithe Irish lad was so happy as I;
No harp like my own could so cheerily play,
And wherever I went was my poor dog Tray.

When at last I was forced from my Sheelah to part,
She said—while the sorrow was big at her heart:
"Oh! remember your Sheelah, when far, far away,
And be kind, my dear Pat, to our poor dog Tray."

Poor dog! he was faithful, and kind, to be sure
And he constantly loved me, although I was poor;
When the sour-looking folks sent me heartless away
I had always a friend in my poor dog Tray.

When the road was so dark, and the night was so cold,
And Pat and his dog were grown weary and old,
How snugly we slept in my old coat of grey,
And he licked me for kindness—my poor dog Tray.

Though my wallet was scant, I remembered his case,
Nor refused my last crust to his pitiful face;
But he died at my feet one cold winter's day,
And I played a lament for my poor dog Tray.

Where now shall I go, poor, forsaken, and blind?
Can I find one to guide me, so faithful and kind?
To my sweet native village, so far, far away,
I can never return with my poor dog Tray.

THE STREAM AND THE OCEAN

Victor Hugo was one of the great poets and novelists of France. Most of his stories have been translated into English, but not all his poems. These short verses have not the grand roll and the passion of his great poems, as those would not suit the subject he has here chosen; but they make a charming little poem, which has been specially translated into English for our book by Harold Begbie.

THE streamlet down from the mountainous glen
Fell drop by drop to the roaring sea;
And the ocean, strewn with the wrecks of men,
Cried: "Whimperer, what dost thou want with me?

"Lo, I am the terror that none may fence,
I drive to the edge of the sky my way;
And can I, who am terrible, strong, immense,
Have need of thy trickles of dew and spray?"

Then the streamlet answered the ocean back:
"O bitter sea, to your furious brink,
Without glory or noise, I give what you lack—
A drop of water that men can drink."

THE IVY GREEN

We all know Charles Dickens as one of the greatest English novelists, but hardly at all as a poet. He was not a poet of any note, however, and wrote very little verse. The poem that follows is at least of interest as it was written by him, whose name is so famous and so deservedly revered.

OH, a dainty plant is the ivy green,
That creepeth o'er ruins old!
Of right choice food are his meals, I ween,
In his cell so lone and cold.
The wall must be crumbled, the stone decay'd,
To pleasure his dainty whim;
And the mouldering dust that years have made
Is a merry meal for him.
Creeping where no life is seen,
A rare old plant is the ivy green.

Fast he stealeth on, though he wears no wings,
And a staunch old heart has he.
How closely he twineth, how tight he clings,
To his friend, the huge oak-tree!
And slily he traileth along the ground,
And his leaves he gently waves,
As he joyously hugs and crawleth round
The rich mould of dead men's graves.
Creeping where grim death has been,
A rare old plant is the ivy green.

Whole ages have fled, and their works decay'd,
And nations have scatter'd been;
But the stout old ivy shall never fade
From its hale and hearty green.
The brave old plant in its lonely days
Shall fatten upon the past;
For the stateliest building man can raise
Is the ivy's food at last.
Creeping on, where time has been,
A rare old plant is the ivy green.

A FOREST HYMN

In this poem William Cullen Bryant expressively conveys to us the feeling of awe and reverence which inspired him when he thought of the beauty and majesty of a great wood.

THE groves were God's first temples. Ere man learned
To hew the shaft, and lay the architrave,
And spread the roof above them—ere he framed
The lofty vault, to gather and roll back
The sound of anthems; in the darkling wood,
Amid the cool and silence, he knelt down,
And offered to the Mightiest solemn thanks
And supplication. For his simple heart
Might not resist the sacred influence
Which, from the stilly twilight of the place,
And from the gray old trunks that high in heaven
Mingled their mossy boughs, and from the sound
Of the invisible breath that swayed at once
All their green tops, stole over him, and bowed
His spirit with the thought of boundless power
And inaccessible majesty. Ah, why
Should we, in the world's riper years, neglect
God's ancient sanctuaries, and adore
Only among the crowd, and under roofs
That our frail hands have raised? Let me, at least,
Here in the shadow of this agèd wood,
Offer one hymn—thrice happy, if it find
Acceptance in His ear.

WHO KILLED COCK ROBIN?

WHO killed Cock Robin?
I, said the Sparrow,
With my bow and arrow,
I killed Cock Robin.

Who saw him die?
I, said the Magpie,
With my little eye,
I saw him die.

Who caught his blood?
I, said the Fish,
With my little dish,
I caught his blood.

Who made his shroud?
I, said the Eagle,
With my thread and needle,
I made his shroud.

Who'll dig his grave?
The Owl, with aid
Of mattock and spade,
Will dig Robin's grave.

Who'll be the parson?
I, said the Rook,
With my little book,
I'll be the parson.

Who'll be the clerk?
I, said the Lark,
If not in the dark,
I'll be the clerk.

Who'll carry him to the grave?
I, said the Kite,
If not in the night,
I'll carry him to the grave.

Who'll be chief mourner?
I, said the Swan,
I'm sorry he's gone,
I'll be chief mourner.

Who'll bear his pall?
We, said the Wren,
Both the cock and the hen,
We'll bear the pall.

Who'll toll the bell?
I, said the Bull,
Because I can pull,
I'll toll the bell.

Who'll lead the way?
I, said the Martin,
When ready for starting,
I'll lead the way.

All the birds in the air
Began sighing and sobbing
When they heard the bell toll
For poor Cock Robin.

To all it concerns,
This notice apprises,
The Sparrow's for trial
At next bird assizes.

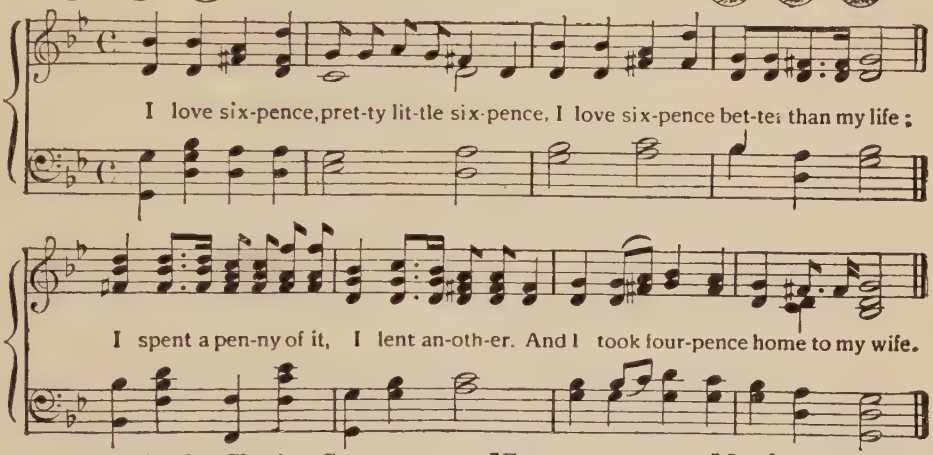
"JACKY, come give me thy fiddle
If ever thou mean to thrive."
"Nay; I'll not give my fiddle
To any man alive.

"If I should give my fiddle,
They'll think that I'm gone mad,
For many a joyful day
My fiddle and I have had."

IF wishes were horses,
Beggars would ride;
If turnips were watches,
I would wear one by my side.

ROBIN THE BOBBIN, the big, greedy Ben,
He ate more meat than fourscore men;
He ate a cow, he ate a calf,
He ate a butcher and a half;
He ate a church, he ate a steeple,
He ate the priest and all the people!
A cow and a calf,
An ox and a half,
A church and a steeple,
And all the good people,
And yet he complained he was hungry.

I LOVE SIXPENCE


I love six-pence, pret-ty lit-tle six-pence, I love six-pence bet-ter than my life;
I spent a pen-ny of it, I lent an-oth-er. And I took four-pence home to my wife.

AS I was going by Charing Cross,
I saw a black man upon a black horse;
They told me it was King Charles the First;
Oh, dear! my heart was ready to burst.

LITTLE Tommy Tittlemouse
Lived in a little house;
He caught fishes
In other men's ditches.

IF you sneeze on Monday, you sneeze for danger;
Sneeze on a Tuesday, kiss a stranger;
Sneeze on Wednesday, sneeze for a letter;
Sneeze on a Thursday, something better;
Sneeze on a Friday, sneeze for sorrow;
Sneeze on a Saturday, see your sweetheart to-morrow.

COLD and raw the north wind doth blow,
Bleak in a morning early;
All the hills are covered with snow,
And winter's now come fairly.

DOCTOR FOSTER went to Glo'ster,
In a shower of rain;
He stepped in a puddle, up to his middle,
And never went there again.

A GREAT ROMAN CHARIOT RACE IN THE DAYS OF BEN-HUR

Nothing delighted the people of Rome more than to watch the exciting chariot races that took place in the great arena known as the Circus Maximus. Round and round the chariots went at a tearing pace, as seen here, and often would collide with one another, either by accident or by the design of the drivers, the horses and charioteers being killed, or crippled for life, as was Messala when Ben-Hur deliberately upset his chariot. Ben-Hur carried no whip, but steered his horses to victory by skill and strength.

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A ROMANCE OF LONG AGO

THE famous book whose story we tell here is a work of fiction dealing with the time of Jesus, and was written by an eminent American soldier-author. Probably no tale of Bible times has enjoyed greater popularity than this graphic and thrilling romance of a young Jew who became a convert through the teachings of Jesus. General Lew Wallace, the author, was already well known as a distinguished soldier and a statesman, as well as a story-writer, when in 1880 he published Ben-Hur. But the fame that book brought to him entirely eclipsed all his earlier achievements. He was fifty-three years of age when the story appeared. With the exception of Uncle Tom's Cabin, probably no novel written in recent times has been more widely read. General Wallace died in 1905.

BEN-HUR

CONTINUED FROM 3534

THE great city of Jerusalem and all the land of Judea were under the heel of Rome. A Roman official known as the procurator administered the government on behalf of the imperial power, and, supported by the stout blades of the Roman legionaries, kept the people of Jerusalem in subjection.

Such was the state of affairs when, some three years before the birth of Christ, a son named Judah was born to Ithamar, of the house of Hur, a prince of Jerusalem and the richest man of his time. Judah Ben-Hur, though of the Jewish race, was the playmate of Messala, the son of one of the high Roman officials at Jerusalem.

Messala, who had been sent to Rome to finish his education as a soldier, had not been long back in Jerusalem when the new procurator arrived from Rome. His name was Gratus, and his entry into the city was made the occasion of a grand procession. The Romans rejoiced in spectacular display, especially when it conveyed to a subject people some notion of the overwhelming power and glory of Rome.

High up on the flat roof of the house of Hur the young Jewish noble stood to watch the procession pass. Leaning over the parapet, he dislodged by accident one of the heavy tiles. This fell into the road below just as Gratus was riding past, and struck him from his horse. In the confusion that followed, both Jews and Romans were ready to believe that a deliberate attempt had been made to slay the Roman official. Though Gratus suffered but slightly from this accident, Messala denounced Ben-Hur as an assassin. Without the semblance of a trial the youth was condemned to the galleys, while the palace of his fathers was seized in the name of the emperor. No one knew to what fate his mother and his young sister Tirzah had been sent. Subjected to the cruelest treatment, the youth was conveyed to the seacoast. As he passed through the little town of Nazareth a youth, who accompanied an elderly man carrying the tools of a carpenter, came forward with quiet fearlessness to the Jewish prisoner. Looking upon him with infinite pity, he gave him a drink of water before the astonished guards could interfere.

A galley-slave was usually worn to death in a year or so. But Ben-Hur had not abandoned the hope that he might yet live to fight for the Lord of Israel. Even in the awful depression of his new life, chained to a bench in the galley and tugging wearily at a heavy oar, he clung to his hope. His shrewd mind told him that by changing from one side of the galley to the other he would be better able to stand the strain of the toil. This change he contrived to effect, so that he developed the strength and muscles of a giant, and became the best oarsman in the galley. After three years as a slave

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Ben-Hur saved the life of Arrius, the Roman tribune.

Out of gratitude for this service and pity for the youth's wrongs, the tribune adopted the young Jew as his heir. A new life opened out again for the son of Ithamar, and he spent five years learning the art of war at Rome. Arrius died within that time, and Ben-Hur became the possessor of his wealth. A great expedition was being prepared to attack the Parthians in the East. Ben-Hur took service in this so that he might experience real warfare and be the better able to help his countrymen some day to throw off the yoke of Rome.

BEN-HUR FINDS AN OLD FRIEND AT ANTIOCH

It was at the great and populous city of Antioch that the forces were being assembled, and thither Ben-Hur went. Here, to his surprise, he found that the greatest merchant, whose ships crowded the harbor, was one Simonides, who had been his father's steward and slave. According to Jewish law, all that he possessed, including his own person, was the property of the son of Ithamar.

But in the mind of Ben-Hur there was no thought of asserting his power over Simonides. He sought him out solely to discover what had become of his mother and Tirzah. The merchant, an aged man, was broken in body, for he had been subjected to cruel torture by Gratus when that tyrant had sought to make him disclose the sources of Ithamar's wealth. Simonides had defeated the designs of the Roman, and had employed his dead master's capital to such good purpose that he had become the richest merchant in all the world. When convinced that Ben-Hur was indeed the son of his old master, he offered to surrender everything to him, according to the Jewish law.

Ben-Hur, however, resolutely refused to profit by the devotion of Simonides, and would claim no more than that portion of the merchant's wealth which had been the property of his own father.

During a visit to the great circus where the favorite sport of chariot-racing was conducted, Ben-Hur saw various charioteers practicing their four-horse teams in the arena. One of these he recognized as the haughty Messala, his old playmate and false friend. A great meeting was to be held in this vast arena in a week's time, when the chariot races would be the centre of interest. Among the various teams there was one of four beautiful Arab horses. These belonged to the sheik Ilderim, who was in despair because the Roman driver did not seem to know how to drive them. Arabian horses were used to gentle treatment, and Roman drivers were accustomed to the merciless use of the lash. The sheik had changed drivers often, but without success, and he was without hope as the contest approached.

BALTHASAR, THE WISE MAN, TELLS BEN-HUR THE STORY OF THE STAR

So, seeking out the sheik Ilderim, Ben-Hur offered to drive his Arab horses in the chariot race. A trial run convinced the sheik that this young man of the powerful arms knew how to manage the team, and he consented to permit Ben-Hur to drive his Arab four in the great race.

It was at the house of the sheik that Ben-Hur again met an old Egyptian whose life he had saved. Balthasar was his name. He was one of three wise men who had heard a mysterious Voice. Being guided by a star, they had foregathered in the desert and made a pilgrimage to Nazareth to look upon the infant Jesus. From the lips of the old man Ben-Hur heard the thrilling story.

Simonides had also heard the story of Balthasar. He was eager to devote his enormous riches to fitting out an army to support this King of the Jews when he should rally all the nation to the flag of Judah. Messala had meanwhile recognized Ben-Hur, and was busily plotting to remove him from his path.

THE FIERCE EXCITEMENT OF THE CHARIOT RACES IN THE CIRCUS AT ANTIOCH

As the day of the sports came round great excitement was displayed about the chances of the Arab team. Not content with the hope of humiliating Messala by defeating him in the race, Ben-Hur employed a loyal Jew to induce the Roman to stake his entire fortune on the outcome of the great race.

In no city of the Roman world at that time, other than Rome itself, could so vast a gathering of people have been brought together. In the great chariot race there were six contestants. Ben-Hur was the favorite, because he stood for the Jewish people and their hatred of the Romans, and there were many Jews in Antioch. In the words of Wallace the description of the race is given.

THE CHARIOT RACE

THE competitors having started each on the shortest line for the position next the wall, yielding would be like giving up the race; and who dared yield? It is not in common nature to change a purpose in mid-career; and the cries of encouragement from the balcony were indistinguishable and indescribable: a roar which had the same effect upon all the drivers.

The fours neared the rope together. Then the trumpeter by the editor's side blew a signal vigorously. Twenty feet away it was not heard. Seeing the action, however, the judges dropped the rope, and not an instant too soon, for the hoof of one of Messala's horses struck it as it fell. Nothing daunted, the Roman shook out his long lash, loosed the reins, leaned forward, and, with a triumphant shout took the wall.

"Jove with us! Jove with us!" yelled all the Roman faction, in a frenzy of delight.

As Messala turned in, the bronze lion's head at the end of his axle caught the fore-leg of the Athenian's right-hand trace-mate, flinging the brute over against its yoke-fellow. Both staggered, struggled, and lost their headway. The ushers had their will at least in part. The thousands held their breath with horror; only up where the consul sat was there shouting.

"Jove with us!" screamed Drusus, frantically.

"He wins! Jove with us!" answered his associates, seeing Messala speed on.

Tablet in hand, Sanballat turned to them; a crash from the course below stopped his speech, and he could not but look that way.

Messala having passed, the Corinthian was the only contestant on the Athenian's right, and to that side the latter tried to turn his broken four; and then, as ill-fortune would have it, the wheel of the Byzantine, who was next on the left, struck the tail-piece of his chariot, knocking his feet from under him. There was a crash, a scream of rage and fear, and the unfortunate Cleanthes fell under the hoofs of his own steeds: a terrible sight, against which Esther covered her eyes.

On swept the Corinthian, on the Byzantine, on the Sidonian.

Sanballat looked for Ben-Hur, and turned again to Drusus and his coterie.

"A hundred sestertii on the Jew!" he cried.

"Taken!" answered Drusus.

"Another hundred on the Jew!" shouted Sanballat.

Nobody appeared to hear him. He called again; the situation below was too absorbing, and they were too busy shouting, "Messala! Messala! Jove with us!"

When the Jewess ventured to look again, a party of workmen were removing the horses and broken car; another party were taking off the man himself; and every bench upon which there was a Greek was vocal with execrations and prayers for vengeance. Suddenly she dropped her hands; Ben-Hur, unhurt, was to the front, coursing freely forward along with the Roman! Behind them, in a group, followed the Sidonian, the Corinthian, and the Byzantine.

The race was on; the souls of the racers were in it; over them bent the myriads.

When the dash for position began, Ben-Hur, as we have seen, was on the extreme left of the six. For a moment, like the others, he was half blinded by the light in the arena; yet he managed to catch sight of his antagonists and divine their purpose. At Messala, who was more than an antagonist to him, he gave one searching look. The air of passionless hauteur characteristic of the fine patrician face was there as of old, and so was the Italian beauty, which the helmet rather increased; but more—it may have been a jealous fancy, or the effect of the brassy shadow in which the features were at the moment cast—still the Israelite thought he saw the soul of the man as through a glass, darkly: cruel, cunning, desperate; not so excited as determined—a soul in a tension of watchfulness and fierce resolve.

In a time not longer than was required to turn to his four again, Ben-Hur felt his own resolution harden to a like temper. At whatever cost, at all hazards, he would humble this enemy! Prize, friends, wagers, honor—everything that can be thought of as a possible interest in the race was lost in the one deliberate purpose. Regard for life even should not hold him back. Yet there was no passion, on his part; no blinding rush of heated blood from heart to brain, and back again; no impulse to fling himself upon Fortune: he did not believe in Fortune;

far otherwise. He had his plan, and, confiding in himself, he settled to the task never more observant, never more capable. The air about him seemed aglow with a renewed and perfect transparency.

When not half-way across the arena, he saw that Messala's rush would, if there was no collision, and the rope fell, give him the wall; that the rope would fall, he ceased as soon to doubt; and, further, it came to him, a sudden flash-like insight, that Messala knew it was to be let drop at the last moment (prearrangement with the editor could safely reach that point in the contest); and it suggested, what more Roman-like than for the official to lend himself to a countryman who, besides being so popular, had also so much at stake? There could be no other accounting for the confidence with which Messala pushed his four forward the instant his competitors were prudentially checking their fours in front of the obstruction—no other except madness.

It is one thing to see a necessity and another to act upon it. Ben-Hur yielded the wall for the time.

The rope fell, and all the fours but his sprang into the course under urgency of voice and lash. He drew head to the right, and, with all the speed of his Arabs, darted across the trails of his opponents, the angle of movement being such as to lose the least time and gain the greatest possible advance. So, while the spectators were shivering at the Athenian's mishap, and the Sidonian, Byzantine, and Corinthian were striving, with such skill as they possessed, to avoid involvement in the ruin, Ben-Hur swept around and took the course neck and neck with Messala, though on the outside. The marvelous skill shown in making the change thus from the extreme left across to the right without appreciable loss did not fail the sharp eyes upon the benches: the Circus seemed to rock and rock again with prolonged applause. Then Esther clasped her hands in glad surprise; then Sanballat, smiling, offered his hundred sestertii a second time without a taker; and then the Romans began to doubt, thinking Messala might have found an equal, if not a master, and that in an Israelite!

And now, racing together side by side, a narrow interval between them, the two neared the second goal.

The pedestal of the three pillars there, viewed from the west, was a stone wall in the form of a half-circle, around which the course and opposite balcony were bent in exact parallelism. Making this turn was considered in all respects the most telling test of a charioteer; it was, in fact, the very feat in which Orestes failed. As an involuntary admission of interest on the part of the spectators, a hush fell over all the Circus, so that for the first time in the race the rattle and clang of the cars plunging after the tugging steeds were distinctly heard. Then, it would seem, Messala observed Ben-Hur, and recognized him; and at once the audacity of the man flamed out in an astonishing manner.

"Down Eros, up Mars!" he shouted, whirling his lash with practiced hand—"Down Eros, up Mars!" he repeated, and caught the well-doing Arabs of Ben-Hur a cut the like of which they had never known.

The blow was seen in every quarter, and the amazement was universal. The silence deepened; up on the benches behind the consul the boldest held his breath, waiting for the outcome. Only a moment thus: then, involuntarily, down from the balcony, as thunder falls, burst the indignant cry of the people.

The four sprang forward affrighted. No hand had ever been laid upon them except in love; they had been nurtured ever so tenderly; and as they grew, their confidence in man became a lesson to men beautiful to see. What should such dainty natures do under such indignity but leap as from death?

Forward they sprang as with one impulse, and forward leaped the car. Past question, every experience is serviceable to us. Where got Ben-Hur the large hand and mighty grip which helped him now so well? Where but from the oar with which so long he fought the sea? And what was this spring of the floor under his feet to the dizzy eccentric lurch with which in the old time the trembling ship yielded to the beat of staggering billows, drunk with their power? So he kept his place, and gave the four free reign, and called to them in soothing voice, trying merely to guide them round the dangerous turn; and before the fever of the people began to abate, he had back the mastery. Nor that only: on approaching the first goal, he was again side by side with Messala, bearing with him

the sympathy and admiration of every one not a Roman. So clearly was the feeling shown, so vigorous its manifestation, that Messala, with all his boldness, felt it unsafe to trifle further.

As the cars whirled round the goal, Esther caught sight of Ben-Hur's face—a little pale, a little higher raised, otherwise calm, even placid.

Immediately a man climbed on the entablature at the west end of the division wall, and took down one of the conical wooden balls. A dolphin on the east entablature was taken down at the same time.

In like manner, the second ball and second dolphin disappeared.

And then the third ball and third dolphin.

Three rounds concluded: still Messala held the inside position; still Ben-Hur moved with him side by side; still the other competitors followed as before. The contest began to have the appearance of one of the double races which became so popular in Rome during the later Cæsarean period—Messala and Ben-Hur in the first, the Corinthian, Sidonian, and Byzantine in the second. Meantime the ushers succeeded in returning the multitude to their seats, though the clamor continued to run the rounds, keeping, as it were, even pace with the rivals in the course below.

In the fifth round the Sidonian succeeded in getting a place outside Ben-Hur, but lost it directly.

The sixth round was entered upon without change of relative position.

Gradually the speed had been quickened—gradually the blood of the competitors warmed with the work. Men and beasts seemed to know alike that the final crisis was near, bringing the time for the winner to assert himself.

The interest which from the beginning had centred chiefly in the struggle between the Roman and the Jew, with an intense and general sympathy for the latter, was fast changing to anxiety on his account. On all the benches the spectators bent forward motionless, except as their faces turned following the contestants. Ilderim quitted combing his beard, and Esther forgot her fears.

"A hundred sestertii on the Jew!" cried Sanballat to the Romans under the consul's awning.

There was no reply.

"A talent—or five talents, or ten; choose ye!"

He shook his tablets at them defiantly.

"I will take thy sestertii," answered a Roman youth, preparing to write.

"Do not so," interposed a friend.

"Why?"

"Messala hath reached his utmost speed. See him lean over his chariot-rim, the reins loose as flying ribbons. Look then at the Jew."

The first one looked.

"By Hercules!" he replied, his countenance falling. "The dog throws all his weight on the bits. I see, I see! If the gods help not our friend, he will be run away with by the Israelite. No, not yet. Look! Jove with us, Jove with us!"

The cry, swelled by every Latin tongue, shook the *velaria* over the consul's head.

If it were true that Messala had attained his utmost speed, the effort was with effect; slowly but certainly he was beginning to forge ahead. His horses were running with their heads low down; from the balcony their bodies appeared actually to skim the earth; their nostrils showed blood-red in expansion; their eyes seemed straining in their sockets. Certainly the good steeds were doing their best! How long could they keep the pace? It was but the commencement of the sixth round. On they dashed. As they neared the second goal, Ben-Hur turned in behind the Roman's car.

The joy of the Messala faction reached its bound: they screamed and howled, and tossed their colors; and Sanballat filled his tablets with wagers of their tendering.

Malluch, in the lower gallery over the Gate of Triumph, found it hard to keep his cheer. He had cherished the vague hint dropped to him by Ben-Hur of something to happen in the turning of the western pillars. It was the fifth round, yet the something had not come; and he had said to himself, the sixth will bring it; but, lo! Ben-Hur was hardly holding a place at the tail of his enemy's car.

Over in the east end, Simonides' party held their peace. The merchant's head was bent low. Ilderim tugged at his beard, and dropped his brows till there was nothing of his eyes but an occasional sparkle of light. Esther scarcely breathed. Iras alone appeared glad.

Along the home-stretch—sixth round—Messala leading, next him Ben-Hur, and so close it was the old story:

"First flew Eumelus on Pheretian steeds;
With those of Tros bold Diomed succeeds;
Close on Eumelus' back they puff the wind,
And seem just mounting on his car behind;
Full on his neck he feels the sultry breeze,
And, hovering o'er, their stretching shadow sees."

Thus to the first goal, and round it. Messala, fearful of losing his place, hugged the stony wall with perilous clasp; a foot to the left, and he had been dashed to pieces; yet, when the turn was finished, no man, looking at the wheel-tracks of the two cars, could have said, here went Messala, there the Jew. They left but one trace behind them.

As they whirled by, Esther saw Ben-Hur's face again, and it was whiter than before.

Simonides, shrewder than Esther, said to Ilderim, the moment the rivals turned into the course, "I am no judge, good sheik, if Ben-Hur be not about to execute some design. His face hath that look."

To which Ilderim answered, "Saw you how clean they were and fresh? By the splendor of God, friend, they have not been running! But now watch!"

One ball and one dolphin remained on the entablatures; and all the people drew a long breath, for the beginning of the end was at hand.

First, the Sidonian gave the scourge to his four, and, smarting with fear and pain, they dashed desperately forward, promising for a brief time to go to the front. The effort ended in promise. Next, the Byzantine and Corinthian each made the trial with like result, after which they were practically out of the race. Thereupon, with a readiness perfectly explicable, all the factions except the Romans joined hope in Ben-Hur, and openly indulged their feeling.

"Ben-Hur! Ben-Hur!" they shouted, and the blent voices of the many rolled overwhelmingly against the consular stand.

From the benches above him as he passed, the favor descended in fierce injunctions.

"Speed thee, Jew!"

"Take the wall now!"

"On! loose the Arabs! Give them rein and scourge!"

"Let him not have the turn on thee again. Now or never!"

Over the balustrade they stooped low, stretching their hands imploringly to him.

Either he did not hear, or could not do better, for half-way round the course and he was still following; at the second goal even still no change!

And now, to make the turn, Messala began to draw in his left-hand steeds, an act which necessarily slackened their speed. His spirit was high; more than one altar was richer of his vows; the Roman genius was still president. On the three pillars only six hundred feet away were fame, increase of fortune, promotions, and a triumph ineffably sweetened by hate, all in store for him! That moment Malluch, in the gallery, saw Ben-Hur lean forward over his Arabs, and give them the reins. Out flew the many-folded lash in his hand; over the backs of the startled steeds it writhed and hissed, and hissed and writhed again and again; and though it fell not, there were both sting and menace in its quick report; and as the man passed thus from quiet to resistless action, his face suffused, his eyes gleaming, along the reins he seemed to flash his will; and instantly not one, but the four as one, answered with a leap that landed them alongside the Roman's car. Messala, on the perilous edge of the goal, heard, but dared not look to see what the awakening portended. From the people he received no sign. Above the noises of the race there was but one voice, and that was Ben-Hur's. In the old Aramaic, as the sheik himself, he called to the Arabs,

"On, Atair! On, Rigel! What, Antares! dost thou linger now? Good horse—oho, Aldebaran! I hear them singing in the tents. I hear the children singing and the women—singing of the stars, of Atair, Antares, Rigel, Aldebaran, victory! —and the song will never end. Well done! Home to-morrow, under the black tent—home! On, Antares! The tribe is waiting for us, and the master is waiting! 'Tis done! 'tis done! Ha, ha! We have overthrown the proud. The hand that smote us is in the dust. Ours the glory! Ha, ha!—steady! The work is done—soho! Rest!"

There had never been anything of the kind more simple; seldom anything so instantaneous.

At the moment chosen for the dash, Messala was moving in a circle round the goal. To pass him, Ben-Hur had to cross the track, and good strategy required the movement to be in a forward direction; that is, on a like circle limited to the least

possible increase. The thousands on the benches understood it all; they saw the signal given—the magnificent response; the four close outside Messala's outer wheel; Ben-Hur's inner wheel behind the other's car—all this they saw. Then they heard a crash loud enough to send a thrill through the Circus, and, quicker than thought, out over the course a spray of shining white and yellow flinders flew. Down on its right side toppled the bed of the Roman's chariot. There was a rebound as of the axle hitting the hard earth; another and another; then the car went to pieces; and Messala, entangled in the reins, pitched forward headlong.

To increase the horror of the sight by making death certain, the Sidonian, who had the wall next behind, could not stop or turn out. Into the wreck full speed he drove; then over the Roman, and into the latter's four, all mad with fear. Presently, out of the turmoil, the fighting of horses, the resound of blows, the murky cloud of dust and sand, he crawled, in time to see the Corinthian and Byzantine go on down the course after Ben-Hur, who had not been an instant delayed.

The people arose, and leaped upon the benches, and shouted and screamed. Those who looked that way caught glimpses of Messala, now under the trampling of the fours, now under the abandoned cars. He was still; they thought him dead; but far the greater number followed Ben-Hur in his career. They had not seen the cunning touch of the reins by which, turning a little to the left, he caught Messala's wheel with the iron-shod point of his axle, and crushed it; but they had seen the transformation of the man, and themselves felt the heat and glow of his spirit, the heroic resolution, the maddening energy of action with which, by look, word and gesture, he so suddenly inspired his Arabs. And such running! It was rather the long leaping of lions in harness; but for the lumbering chariot, it seemed the four were flying. When the Byzantine and Corinthian were half-way down the course, Ben-Hur turned the first goal.

And the race was WON!

The consul arose; the people shouted themselves hoarse; the editor came down from his seat, and crowned the victors.

The fortunate man among the boxers was a low-browed, yellow-haired Saxon, of such brutalized face as to attract a second look from Ben-Hur, who recognized a teacher with whom he himself had been a favorite at Rome. From him the young Jew looked up and beheld Simonides and his party on the balcony. They waved their hands to him. Esther kept her seat; but Iras arose, and gave him a smile and a wave of her fan—favors not the less intoxicating to him because we know, O reader, they would have fallen to Messala had he been the victor.

The procession was then formed, and, midst the shouting of the multitude which had had its will, passed out of the Gate of Triumph.

And the day was over.

. . . . . .

With the success of Ben-Hur in the magnificent and madly glorious chariot race our quotation from the book ends. The rest of Ben-Hur's story we tell briefly.

Ben-Hur at once withdrew to a place of hiding until he might safely proceed to Jerusalem to search for his mother and sister. But he had little to fear from any vengeance of Gratus. That unjust governor had now been displaced, and a new governor named Pontius Pilate ruled in his stead.

WHAT HAPPENED AT JERUSALEM UNDER THE NEW GOVERNOR

The new governor, in taking over his charge, had discovered that in a subterranean prison, attended by a dumb jailer, were two women, Ben-Hur's mother and sister. They had long been kept there by Gratus, and from the terrible existence they had led, had both been stricken with leprosy. Pilate gave orders that they should be liberated and sent to the hill outside the city. An old servant encountered them and daily took them food.

When Ben-Hur at length had news of the fate of his dear ones, every effort to discover them was vain. Thinking them to be dead, he devoted himself to raising an army to fight for the King of the Jews when He should come.

Now, at this time, the infant whom Balthasar had journeyed to Nazareth to look upon had grown into manhood. He had been going about throughout Judea, teaching the common people to practice gentleness and mercy, to worship God in holiness, and to believe in Him and His Son Jesus if they would be saved.

Among these believers was Balthasar, whom Ben-Hur met again on his way to look upon the Teacher he had worshiped as a babe. The young Jew accompanied the old man on his journey. When he saw the Nazarene he recognized in Him the gentle face and pitying eyes that belonged to the little carpenter who had given him water to drink when the Roman guards were taking him to the galleys. Thrilled and fascinated though he was by this gentlest of teachers, he was not without a feeling of disappointment. All his preparations to raise an army that would fight with mortal weapons for the King of the Jews were useless.

BEN-HUR BECOMES A FOLLOWER OF JESUS OF NAZARETH

From place to place Ben-Hur followed Jesus, observing Him closely, witnessing the miracles that He wrought, believing in Him. He still hoped that he might be called upon to fight for Him as an earthly prince, for he could not understand why the kingdom of Jesus was not of this world. So it came about that Ben-Hur was one of the multitude that went up to Jerusalem with Jesus.

As they were passing the hill of the lepers two women ran down, and throwing themselves at the feet of the Master, besought Him to make them clean. He saw Jesus bless them and tell them that their faith had made them clean. Curious, and still a little doubting, Ben-Hur lingered behind to see if it was as the Master had said. Behold, his mother and sister stood before him restored to health.

It was required by the law that persons who had been cured of leprosy should tarry without the walls of Jerusalem for nine days before being allowed to return to their homes. Ben-Hur would not desert his mother and Tirzah during these nine days which they had to wait outside the city. So he was not present at those world-moving scenes when the Jewish multitude had turned against the gentle teacher of humility and holiness. In that short time the rabble and the priests had hounded Him to death and drawn from the reluctant Pontius Pilate consent to His execution.

THE LAST THAT BEN-HUR SAW OF HIS LORD AND MASTER

When Jesus was crucified on the hill of Calvary, Ben-Hur stood, in company with Simonides and Balthasar, believing that the figure on the central cross was that of the true Messiah. So affected by the dreadful scene was Balthasar that, before the earthquake had come to strike terror through all that multitude, his spirit had taken flight to be with Him who died on the Cross.

Not many years after this greatest event in the history of the world, Ben-Hur, who had married the daughter of Simonides, determined to use his riches in the cause of Christianity. To the construction of the Roman catacombs the fortunes of Ben-Hur and Simonides were devoted.

The Christ, as Ben-Hur saw him, had "a form slightly above the average in stature, and slender, even delicate. His action was calm and deliberate, like that habitual to men much given to serious thought upon grave subjects; and it well became his costume, which was an undergarment, full sleeved and reaching to the ankles, and an outer robe called the talith; on his left arm he carried the usual handkerchief for the head, the red fillet swinging loose down his side. Except the fillet and a narrow border of blue at the lower edge of the talith, his attire was of linen yellowed with dust and road-stains. Possibly the exception should be extended to the tassels, which were blue and white, as prescribed by law for rabbis.

"The head was open to the cloudless light, except as it was draped with hair long and slightly waved, and parted in the middle, and auburn in tint, with a tendency to reddish golden where most strongly touched by the sun. Under a broad, low forehead, under black well-arched brows, beamed eyes dark-blue and large, and softened to exceeding tenderness by lashes of the great length sometimes seen on children, but seldom, if ever, on men. The delicacy of the nostrils and mouth was unusual; and when it was taken into account with the gentleness of the eyes, the pallor of the complexion, the fine texture of the hair, and the softness of the beard, which fell in waves over his throat to his breast, never a soldier but would have laughed at him in encounter, never a woman who would not have confided in him at sight, never a child that would not, with quick instinct, have given him its hand and whole artless trust; nor might any one have said he was not beautiful."

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 3861.

The common European Buzzard.

THE DAY BIRDS OF PREY

CONTINUED FROM 3624

WE enter now the presence of the regal birds, the sovereigns of the air. We have spoken of cuckoos and sparrows while eagles were soaring. Now we come to the day birds of prey —the bold, fierce hunters of the air corresponding to the great flesh-eating mammals that prowl the earth.

The resemblance in qualities and dispositions between the two Orders is striking and impressive. Ornithologists are not entirely agreed as to the classification of these birds. Some give the scientific name as *Accipitres,* a word from the Latin tongue implying sharp, swift flight and action; or *Raptores,* which likens the birds to robbers. And swift-winged robbers they are. The family of which we shall speak is the *Falconidæ,* from the word which means "sickle."

The earth must have its safety valve, and the volcano is the safety valve perfected. The animal family must have its check and brake, and the day birds of prey have fulfilled the purpose of killing the superfluous. Indeed, it is not only as destroyers of life that the birds of prey are notable; we rely enormously on their efforts to rid the earth of pollution which would affront our senses and poison our health. They remind us of an era when existence was a gory struggle, when might was right, and mercy and the gentle handling of life's business was not yet cradled in the heart. They have been the natural censors of the rodents that destroy our crops, of the herb-eaters that consume our pastures, of the birds that ravage our orchards, of the reptiles whose bite is swift death to man and beast.

If you look at a book on birds of prey you may find them divided into the following groups: Ospreys, Falcons, Buzzards and Eagles, Kites, Hawks, Harriers, Caracaras. Vultures are given separately. In this chapter we shall range over the world. More is told about our American species in the chapters on Birds of North America.

The least formidable, from human standpoints, is the Osprey—as to which, however, there is the fish's point of view. The gulf between this bird and the fishing owl is not great, but that arises rather from parallel development than from blood relationship. The habits of the two are not unlike, save that the osprey, which is scattered widely over the earth, is a day bird.

To us the osprey is harmless, even when we assail its nest. Then it acts like a feathered fury. The bird flies with the grace and beauty of its kind,

but ends its flight with such a plunge into sea or river that an onlooker might fancy it shot dead. It goes down swiftly, coming up with its prey, not in its beak, but in its talons. There we have a capital difference in the methods of land warriors and aerial hunters. The lion and tiger hold with the claws to kill, and carry with the mouth. The birds of prey kill with the terrible beak, but carry with the claws.

The osprey is found in nearly every part of the world where there is water. It is two feet long, brown in color, for the most part, and the wings are long and strong. It builds its enormous nest of sticks on cliffs or trees near the water, and returns to the same nest year after year. Frequently he is robbed of his prey by one of the eagles. It is believed that there is only one species.

THE WILD HOMES OF THE FALCONS OF THE NORTH LANDS

The falcons are wonderful creatures, whether the Greenland falcons or the Iceland falcons, or the larger Norwegian Falcon, or Gyrfalcon, which ranges from the old home of the Norsemen through all Northern Europe, right away to the dim, cold lands of Northern America and Alaska, and makes a prosperous living in adversity.

It is curious that men have been able to call into servitude birds from this fierce line. In the Middle Ages, and earlier, falconry was a favorite sport in Europe. Falcons were trained to bring down birds from the sky and then return to the owner's wrist. The three large falcons we have mentioned were used and also some of the smaller species.

To-day, in Palestine and India, the Saker Falcon is employed to hunt birds and animals. Hawks will not peck out a hawk's eyes, the saying runs, but sakers will hawk kites, chasing and grappling them in midair, to bring them dead to the ground, as eagerly as a kestrel strikes down a sparrow.

The Peregrine Falcon is the typical species. There is hardly a country in the world where it has not been found. It is the bird we often call the Duck Hawk. For its bulk it is the most powerful of all the birds of prey, and also the swiftest. As is general in the birds of prey, the male is the smaller of the species, fifteen inches long as against the seventeen inches or more of the female. Nesting sometimes in tall trees, the peregrines love better the cliff and headland, fit home for a creature in which flight seems to have reached perfection.

THE FALCON'S AMAZING FLIGHT WHICH MAN CANNOT EQUAL

Generally the food of the peregrine is birds. Its long pointed wings carry it through the air with the speed of an airplane. As a fact, we have no man-made engine of locomotion to compare with it. The peregrine is so fast, so enduring, so swift to turn and double, to rise and to descend, that we can scarcely hope to match it.

True, our airplanes can race it in a straight line, but they have engines with energy amounting to hundreds of horse-power; the peregrine is but one bird-power, and it does things in the air which, one fears, our aircraft can never rival—rising like a lark, soaring in the wind, speeding straight like a rushing swift, dropping sheer out of the skies to the earth in one grand plunge like a falling meteor, but safe, unjarred, unfailing.

Few birds are too swift or courageous for the bold peregrine to engage. It will strike at quarry bigger than itself, as a wild goose, but a pigeon-breeder hates the bird. We must tell the truth. This wonderful hawk is a terror to pigeons and other birds.

A climber in the summer of 1920 was horrified to find in a peregrine's nest the rings that had once encircled the legs of twenty-two homing pigeons. Worse was to follow in the summer of 1923. It happened that a fisherman saw a falcon seize a pigeon in the air. He followed its line of flight; then, climbing down to the marauder's nest, saw an overwhelming spectacle. There were the unpalatable remains of many dinners, the parts of birds which the hawks do not eat. The feet of hundreds of pigeons were there, many of them bearing the numbered rings which owners attach to the legs of valuable birds. The tyrants had snapped up these adventurers as they crossed their line, engaged on races which had begun in various parts of the country.

OTHER FALCONS, BOTH EUROPEAN AND AMERICAN

Several other true falcons belong to North America. The Prairie Falcon is a bird of the plains, and is seldom seen east of the Mississippi. The Pigeon

BIRDS OF PREY THAT HUNT BY DAY

The Indian Kite.

The Chilean Sea-eagle.

The Goshawk.

The European Sparrow Hawk makes a raid on a flock of chaffinches.

The Hobby.

The Osprey alighting.

The King Condor.

Hawk, sometimes called the American Merlin, is a small slaty blue falcon which breeds chiefly in Canada and winters in the United States. Richardson's Merlin is another western falcon, and the Sparrow Hawk is usually placed with them.

The European Hobby is rarer than the peregrine. They haunt Southern Europe in pairs, and should be welcomed as devourers of hosts of insects as well as their due measure of small birds. The hobby hen measures thirteen inches, but the wings seem very long.

THE MERLIN THAT FOLLOWS ITS QUARRY WHEREVER IT MAY GO

Like the peregrines, the European Merlins have long been trained to hunt for man. They are more pertinacious than the larger bird, which, like a great cheetah, adds dignity to speed, and abandons the obviously difficult, as when a bird goes to refuge in a tree or cavity. Not so the merlin. It follows in after the quarry, like a fiery little terrier into a fox-hole, and there, in the bird's own hiding-place completes its deadly mission. Only an expert can detect any difference between this bird and our own pigeon hawk.

There is some doubt whether the European Kestrel is a true falcon. It is the commonest European bird of prey. Together with swiftness it has an ability which we are spending thousands of dollars to impart to airplanes. It can hang apparently motionless in the air while searching for prey on the ground, like a little living statue suspended on high by invisible agency. It is called the "wind-hoverer" because of this gift. There is no prettier sight than a kestrel stationary up in the sunlight, its wings vibrating so rapidly as to be invisible, its keen, handsome little head turning from side to side to show that the thing is real, alive, and not a happy fancy of the mind. It is practically identical with our sparrow hawk.

The falcons have their pigmies, like other birds, and they have also their resplendent crested members, but we pass on to the sub-family of the buzzards. In North America the name is often incorrectly applied to one of the vultures of which we shall speak presently. In fact the buzzards are hawks, and there are more than thirty of them. Among American buzzards may be named the Red-tailed Hawk, often called the Hen Hawk and also the Red-shouldered Hawk. Swainson's Hawk, or Buzzard, common in the western half of North America, is almost the same bird as the Common Buzzard of Europe. The breast has a large cinnamon-red patch. The Rough-legged Hawk, another buzzard, has legs feathered to the toes. In spite of their names none of these is very dangerous to poultry.

Now we pass to another group, the Kites. There are about thirty species, nearly all belonging to the tropics. Formerly some were common in Europe, but they are now becoming rare. The Common Kite is reddish brown, and in former days was the scavenger in European cities. Four species are found in southern United States. The Swallow-tailed and the White-tailed occasionally wander into Canada, but the Mississippi Kite and the Everglades Kite are strictly southern birds.

The White-tailed Kite seems guiltless of offense against us. Its flight is easy and powerful. The Swallow-tail Kite is mainly a snake-eater, and those who have most closely studied it uphold this kite even against the swift for its tireless, graceful flight, beginning before the sun is up, and ending when the sun has been long below the horizon.

THE KINGS OF THE AIR THAT LIVE TO BE A HUNDRED

Now we pass on to the true kings of the air. The eagles await our coming. These are the most majestic creatures that wing the air. They have not the swift-turning flight of the hawks, they cannot rise straight up from the ground like the larks; they are like airplanes, and must have a long sweep of open land, or preferably a height, from which to take off. But in the air, here is dignity, power and splendor. The birds live to a great age, perhaps as much as a century. They occupy one dwelling-place for generation after generation. Haunting the wildest country, they seem, as they rise screaming into the skies, the very spirit of a scene in which mystery and something of terror mingle with rugged loveliness.

THE EIGHT KINDS OF SEA-EAGLE THAT INHABIT THE EARTH

At least eight species of sea-eagles are distributed about the earth. South America has the misfortune to lack a species, and this fact is one of the curi-

osities of animal distribution, for the Bald Eagle is found in North America and is the national emblem of the United States. An alternative and more correct name for this bird is the White-headed Sea-eagle.

This bird was formerly common all over North America, and is still to be found near the coast and the Great Lakes, and sometimes along large rivers. After it reaches the age of three years its head, neck and tail are white. They seem to mate for life and occupy the same nest year after year. They eat fish thrown upon the shore, or fish which they have compelled the osprey to drop, and sometimes catch them for themselves. They sometimes kill game birds, or small mammals and are known to eat carrion.

THE WHITE-TAILED ERNE, THE EUROPEAN SEA-EAGLE

The European example is the White-tailed Sea-eagle, of which the female measures thirty-four inches, the male six inches less. They build on craggy peaks remote from the haunts of man; but in the forest lands of Northern Europe they are at home in high trees. If not disturbed, they nest in the same spot and the same nursery annually, adding a little each year to their furniture, so that in the end their rough nest of twigs and sticks becomes a structure six feet and more in height.

Shepherds tell stories of the experiences of lambs with them. And there are tales of game birds caught by them. But in general it is birds of the shore and of the sea which these giants snap up, and these are far fewer than their catches in the water itself.

The sea-eagle has not his name for nothing. He has an eye like a telescope, which sees into the mysteries of the deep; at the sight of a prize he hurls himself at the water, dips like a flash with those terrible talons, and up comes the wriggling prize—big fish, small fish. It may be a herring; it is more likely to be of mackerel size; and on occasion the salmon is the reward of enterprise.

A THRILLING FIGHT IN AIR AND SEA BETWEEN A FISH AND AN EAGLE

But salmon vary in size, and sometimes are heavy, and one eagle has been known to grasp more than he could either raise or release. This bird had his talons firmly fixed in the plump back of a salmon, whose bulk would have graced the table of an alderman. Lift it into the air the bird could not; draw out its talons it either could not or would not. So there was a desperate struggle. First the eagle would lift the fish a little way out of the water and drop back with it; then the salmon would play the submarine and violently submerge, taking down the eagle with it. How the matter would have ended—perhaps in the death of both—we are unable to say, for an onlooker finished the contest by capturing both pursuer and pursued—surely a unique haul.

In Asia there is a sea-eagle greater than either of these. Steller's Sea-eagle, found in Siberia and occasionally in the Aleutian Islands, has white thighs and also shows white in the wings. It is the largest of all. There are African species also.

A BIRD OF THE AFRICAN HEIGHTS THAT FOLLOWS THE JUNGLE FIRE

We must have a word on the Bateleur Eagle, an African bird of the heights, which preys on the young of deer, antelopes and sheep, and distinguishes itself in action against snakes and other reptiles, of which its unflagging appetite demands unending supplies.

Fires in the jungle and grassy karoo, instead of frightening off the bateleur, are a summons to a feast. It follows the line of the fire, and snaps up the reptiles which emerge from it, even dashing with furious haste into the smoke to snatch up something it might otherwise miss. What a choice of fates for a living creature—death by fierce flame or by the beak of this feathered emblem of destruction! Its color is a strange mixture of maroon, black and gray.

The supreme sovereign of the Order is the superb Golden Eagle. The size is large. The wings of a female frequently measure seven feet from tip to tip—she is always larger than the male. The color is deep brown, in parts almost black, but the feathers on the head and neck are tawny or reddish brown. The base of the beak and the legs are bright yellow.

These birds do not disdain the union of art with power. Two will beat over ground together, so that as one puts up a hare or a rabbit by the strokes of its wings, the second will catch the animal as it flees in panic from the original

assailant. That is one of the cleverest things the king of birds is known to do. But it is not the most audacious, for a golden eagle has been seen to make its lightning plunge down through the air to snatch a grouse wounded by a shot, and carry it away before it can touch the ground. And another has been seen to stoop before panting hounds, clutch up the hare they were pursuing, and sail away with it.

There is not much that one would doubt of the golden eagle's daring, though here and there, as with ourselves and as with lions and bears and dogs, among the courageous may be found cowardly exceptions. In general, however, the king of birds, a splendid savage measuring a yard, lives up to the tradition which has been woven around it.

The nest of the golden eagle is perched high among mountains, or high hills, or on the shelves of inaccessible cliffs. It ranges the whole northern hemisphere. It was never common, for so great is its appetite and that of its young that usually only one pair lives in a considerable territory. Its food comprises birds, rabbits, hares, fawns, lambs and the foulest carrion. It is like the lordly lion; it will kill with dignity anything that opposes it, or it will batten like a jackal on fetid garbage.

There are legends that golden eagles carry off children and devour them, and in Scotland we find ancient inns bearing the name The Eagle and Child. But there seems no truth in the tradition. Admittedly eagles carry away fawns as heavy as babies, but not up through the air to their homes. They will seize a fawn on a height and fly downhill with it to a lower level, and devour it there, or carry away portions to their nestlings. That is quite a different matter from rising sheer into the heights with such a burden.

THE FEARFUL WORK OF THE BEAK AND TALONS OF THE GOLDEN EAGLE

Yet they perform wonders of daring and skill up in the wilds where the deer run free. An eagle will swoop on a herd feeding near a cliff, and, attacking one, will beat it with its wings, assail it with its great cutting beak, gripe it with its talons, and drive it headlong over the chasm, flying down then to feed at leisure.

There is nothing stranger recounted in the fables about these eagles than some of the stories which are undoubtedly true. Outside a forest a solitary roebuck was feeding. A golden eagle swooped down on it and drove its talons into the animal's back. Instinct came to the aid of the deer, and it turned and dashed for the safety of the wood, the great bird riding it. The first tree they met nearly achieved the object of the roebuck in striking its enemy from its back. The eagle took a deeper grip with its talons, but, as a second tree was neared, retaining its hold with one claw, it grasped the stem of the tree with the other.

So great, however, was the force with which the buck was moving, and so tenacious the hold of the eagle, that the bird was rent asunder, one half remaining firmly clinging to the tree, the other attached to the body of the deer.

It is curious that the handsome Imperial Eagle, numerous in South and Central Europe, and away to India and China, differs, according to country, in the character it betrays. In Europe it is regarded as second in dignity and courage only to the golden eagle; in India naturalists look upon it with disfavor as nothing more than a great kite. Has climate anything to do with it?

Does climate affect even the golden eagle? Here we either kill it or confine it to menageries. In Central Asia it is tamed to work for man as the hawks are elsewhere. But there is something stirring in the thought that the game of the golden eagle which hunts at the behest of a master is—the wolf!

Spotted eagles, tawny eagles, wedge-tailed eagles, eagles which exist chiefly on the flesh of monkeys; eagles so forbidding of aspect as to be named harpy eagles—harpy being one of the fabulous monsters of old belief, which pictured a ravening bird with the features of a cruel woman—so the list runs on.

In the next group, that of the true hawks, we are upon difficult ground, for it is difficult to define a hawk. Apparently a hawk is a day bird of prey which is neither an eagle, a vulture, a falcon, a buzzard, a harrier nor a kite. Even with all these omitted there are about a hundred species.

Generally it may be said that a hawk has a short stout bill, a long square tail, long bare legs, and that its wings do not

extend to the end of the tail. The cutting edge of its upper bill is never notched. Hawks are scattered over the world, but the number of species of true hawks in Europe and North America is small, though many birds are called hawks.

The most common European species is the Sparrow Hawk. Here looks match performance, for these birds have the very carriage and countenance of battle. The female is nearly fourteen inches long, and the species is beautifully fitted for its life. A grand flier, it prefers to get its prey by stealth. It haunts wooded country, whence it dashes out on the bird which is to form its dinner, suddenly, to take its victim by surprise.

It seems always keeping its strength in reserve for flight in turn. And when man and gun are near, that is often enough what happens. The sparrow hawk really earns his keep nobly by killing birds where birds are too many. But men who breed birds to be shot in thousands each year prefer to be their own slaughterers. They hate this child of Nature, the sparrow hawk, which, for its sustenance, weeds out the weakliest of the covey.

Montagu's Harrier hiding its eggs.

We have two hawks closely akin to the European sparrow hawk. They are Cooper's Hawk and the Sharp-shinned Hawk. Both are common over North America. Both live mainly on birds and do not object to poultry. The American Goshawk is a larger bird, sometimes two feet long. The name means "goose hawk," and the European species was trained to kill the wild goose.

The next group is the Harriers. They are ground-loving birds which catch small birds, mammals and reptiles, but, in the case of the Marsh Harriers, find frogs and fish pleasant fare. Montagu's Harrier was once common in Europe, but is now rare. Our species is called the Marsh Hawk or the Marsh Harrier.

THE CARACARA OF SOUTH AMERICA THAT RUNS AS WELL AS IT FLIES

Near allies of the harriers are those South American hawks, the Caracaras, hawk-like in build and appearance, but not in habit. They are flesh-eaters, but they run as well as they fly. Flocking in numbers like wolves in a pack, they hunt in company, and, in the manner of the jackal following in the wake of the lion, the caracaras keep pace with human hunters to eat the offal and the carrion which they may furnish. One species, Audubon's Caracara, ranges into the southern part of the United States.

Where exactly to end the line of hawks and begin the line of vultures is a difficult matter, seeing that the great Lammergeiers, or Bearded Vultures, are closely related to both. The lammergeier is more vulture than hawk, yet it has the head and neck feathered, as no vulture should. The lammergeier is a magnificent bird, forty-two and more inches long. It lives in the mountain ranges of Southern Europe and of Asia, but descends to the plains to feed, chiefly on carrion, but sometimes on animals killed by itself. The name means "lamb vulture."

Sad stories of the practices of the lammergeier are told in some of the storybooks. A mother working in a field leaves her baby at the edge, and the great bird swoops down and carries it away, never to be seen again. Some of these stories may be true, for the lammergeier is quite powerful enough to carry the weight of a baby or a lamb.

The vultures themselves are of hideous aspect and habit, bareheaded or barenecked, sometimes both; they are weak of feet, so that they cannot carry their prey, but must gorge on the ground where they find it. The sea-eagles have their feet and legs bare of feathers so that they may not be impeded by clogging their limbs when plunging them into the water; the vultures have their heads and necks bare because they plunge both into the decaying flesh that constitutes their meals.

THE GOOD WORK THE HIDEOUS VULTURES DO FOR MANKIND

They are the jackals and hyenas of their Order, living chiefly on filth, yet they are of value to us. They clear the earth of reeking impurity and are highly valuable servants. In many cities of the Eastern World disease would be even more common but for these creatures. But it is impossible, even granting that they are superb creatures on the wing, to take delight in their form or functions.

The Secretary-bird of Africa, however, is a vulture which is not repulsive. In fact, in a freakish fashion he is not unhandsome in appearance. The feathers at the back of the head are supposed to look like a quill pen stuck behind the ear. Hence we have the name. The secretary-bird plays the part of a watch-dog about the farms of South Africa.

His long legs make a football of the deadliest snake, and his knobbed wings beat the reptile to death, whereupon the poisonous reptile makes him a satisfactory meal. Tortoises, lizards, mice, birds and even baby deer help to fill his larder.

All the vultures mentioned except the caracara belong to the Old World. The New World vultures are an entirely distinct family. The most important members are the Condors of South America, birds whose wings might have startled even Sindbad after his adventure with the roc. They have a span of full eleven feet. Condors, indeed, are the largest of all flying birds. They are mountaineers by birth and residence, but they float down to the plains below, carrion-seeking, or to act the part of slaughterer to aged, enfeebled horses, to sheep and lambs and calves, and even to snap up unwary dogs incapable of self-defense.

They build no nests, but lay two white eggs upon the bare rock. The young are covered with whitish down and cannot fly until two years old. Their appetites are enormous. One has been known to eat eighteen pounds of meat in a single day. Often they gorge themselves until they cannot fly. The King Vulture and the California Vulture are closely related, but are smaller.

THE WIDE RANGE OF THE DAY BIRDS OF PREY

Related to these are the Turkey Vultures, or Turkey Buzzards, lordly fliers which have beaks so weak that they cannot tear open the dead body of an animal until time and heat have done their work. They will perch near by for days, perhaps, waiting till corruption has achieved its mission; then they flock down and feed till the food ebbs back out of their mouths as they move. They are voiceless, and hiss like reptiles when disturbed.

They are common in the southern part of the United States and occasionally may be seen as far north as Canada. In some southern cities they pick up their living in the streets. Like other vultures, they fly well and can hang suspended in the sky, apparently without moving their wings. There has been much dispute as to whether they find food by sight or smell, but most observers think they rely upon their keen eyes. They lay one or two eggs on the ground, on rocks, or in a hollow stump in thick woods. A near relative, the Black Vulture, is smaller, stouter and blacker.

This vulture is seldom seen in the North, but it is found in large numbers in all of tropical America. In the country a large dead animal may be absolutely covered by dozens of these repulsive creatures. In a southern city one old fellow was easily recognized because of the loss of a foot. For twenty years he was accustomed to frequent the slaughterhouse to claim his living. Many probably live to a great age. They often sleep on a roof, snuggled against a chimney.

We seem to have come low in the scale of our birds. In this group we have creatures whose weapon is a swift, unfailing sword; creatures which profit by disgusting decay. It takes all sorts to make a world; it has needed such qualities in these great creatures to make the world safe for us. Let us humbly remember that only the civilized portion of humanity to-day is raised above the level of the eagle and the vulture.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 3881.

EAGLES AND THEIR RELATIONS

PONDICHERRY VULTURE

RUPPELL'S VULTURE

BLACK VULTURE

MONKEY-EATING EAGLE

IMPERIAL EAGLE

BRAZILIAN CARACARA

JARDINE'S HARRIER OF AUSTRALIA

PEREGRINE FALCON

THE LAMMERGEIER

THE BALD EAGLE

SHORT-TOED EAGLE

HARPY EAGLE

AFRICAN SEA-EAGLE

THE EUROPEAN BUZZARD ON GUARD OVER ITS YOUNG

THE SECRETARY BIRD

THE CROWNED HAWK EAGLE

THE EGYPTIAN VULTURE

KOLBE'S VULTURE

THE CONDOR

THE GRIFFON VULTURE

THE MERLIN PREPARES A MEAL FOR ITS YOUNG

THE WHITE-TAILED EAGLE

THE HARRIER HAWK

THE BLACK KITE

SOUTH AFRICAN KESTREL

THE GREENLAND FALCON

THE KOREAN SEA-EAGLE

THE GOLDEN EAGLE

THE SPARROW HAWK

A YOUNG SPARROW HAWK

THE MARTIAL HAWK EAGLE

THE CINEREOUS VULTURE

COMMON, OR RED, KITE

A YOUNG CONDOR

BLACK-CRESTED EAGLE

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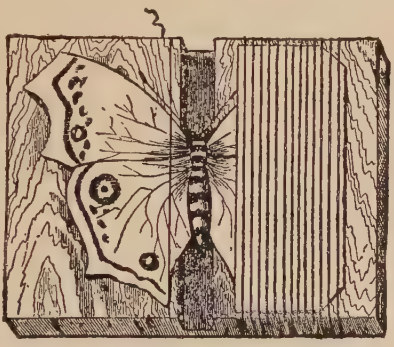
HOW TO MAKE A BUTTERFLY COLLECTION

CONTINUED FROM 3632

ANY boy or girl who wishes to make a suitable collection of butterflies should prepare to do this in the proper way. The first thing needed is a good net. Brass rings with handles may be bought from a sporting goods store. In fact old landing-nets for fish will answer the purpose very well. However, any boy or girl can easily make the necessary frame. First secure a smooth light hoop about 15 inches in diameter. If you cannot find one small enough make it by cutting down and nailing a barrel hoop. Then bind the hoop firmly to a pole or rod about 3 feet long. Next cut out a round piece of mosquito-netting about ¾ yard in diameter, and fasten it to the hoop with small tacks or staples. Now the net is ready for use in the field.



Butterfly setting-board.

The permanent case for your specimens must be a neat shallow box of soft wood, preferably with a glass cover. Thin pieces of cork should be glued to the inside of the bottom at regular intervals, according to the size of your butterflies. Upon these the insects are mounted with fine pins which run through the body. When the case is full it should be sealed air-tight, for if there is the finest crack moths may enter and ruin your collection. Of course you cannot take this case to the fields, so you must have some small paper boxes in which you can mount your specimens until the wings are dry and they are ready to place in the case.

The best thing for a young naturalist to use to kill the butterfly is ether. As it evaporates very quickly, it does not injure the color or texture of the beautiful insects, and it ends the life of the butterfly instantly and without giving pain. There are other chemical compounds often used by naturalists such as cyanide of potassium, but they are too dangerous for young folks to handle. It is found that ether is much safer, and it is sure to kill the butterflies.

Now place your net over your shoulder, take the ether, which should be in a bottle with a glass stopper to prevent evaporation, the box for mounting specimens and some fine pins, and start out in search of butterflies. You should first try to catch some of the large ones that fly about the fields and by the roadside. The person who would entrap a butterfly must be alert and follow where it leads. If the net descends skillfully the butterfly is certain to flutter in its meshes. Now gather the net carefully in your hand so that the creature will have no room to flutter and break its wings. Then pour only a drop or two of ether on its head and it will lie motionless.

Next take the dead insect in your hand, being careful to touch the wings as little as possible, and pass a pin through its body. Then fasten it in the bottom of your box and open the wings carefully, arranging them at once while they are soft and flexible. A pin fastened between the wings but not through them will hold them in place until they are dry.

When you are ready to mount the butter-

fly prepare a setting-board with a groove as shown. By putting the body into the groove, and using a fine needle, the wings are easily spread, the front wings being placed quite well forward and the back wings being placed well away from the body. The antennæ are then put in position, and two pins are crossed under the abdomen so that it will not fall. Pieces of stiff cardboard are placed over the wings as shown, and bound down with the string. These are left on the setting-boards at least one week. In case the insects become too dry to spread at any time they may be quickly softened by putting them, for only a few hours, into any closed dish in which wet sand has been placed.

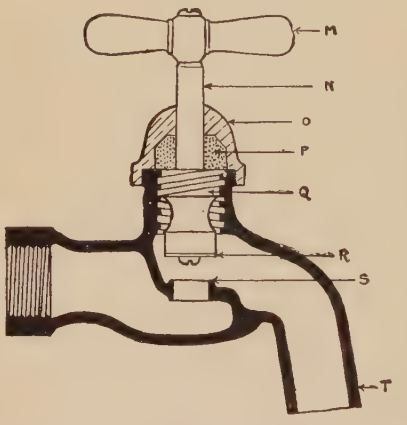
There are various ways of arranging a permanent butterfly collection, but the best way is to provide a light box about 2 inches deep and from 20 to 24 inches square. If possible have the bottom covered with cork, and also have the top protected with a glass cover. Be certain to cover the cork bottom with white paper. The insects should be arranged as they are classified in science, each with a label below the insect, giving such information as its scientific name, date and place of capture. With each might well be placed the other stages of its life if possible, such as egg, caterpillar, pupa and cocoon, if it makes one. Some persons prefer to set insects on pins arranged to show their color to the best advantage.

It is a good idea for beginners to start by collecting butterflies or moths in the fields around their homes. The next step might be a collection of butterflies of the state. By advertising in local newspapers collectors can usually get in touch with enthusiasts in different parts of the state and can exchange specimens. Some collectors search for butterflies of a particular genus or family. Others want specimens which show how butterflies mimic their surroundings.

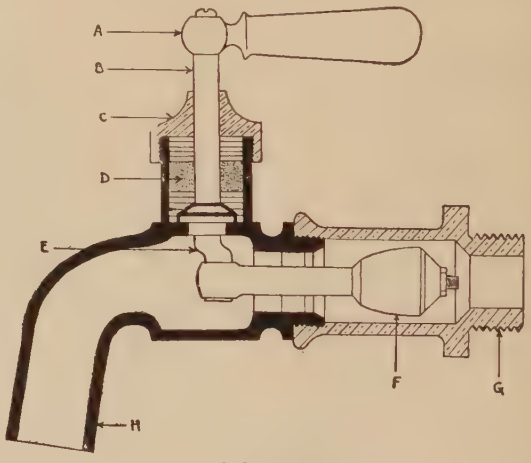
HOW TO REPAIR LEAKING FAUCETS

IT is annoying to have leaking faucets, and it is not always possible to have them repaired just when you wish the leaks stopped. Any person who wishes to be able to stop these leaks may do so by studying the simple mechanism of the particular faucet which needs to be repaired.

Faucets leak either through the nozzle or through the packing nut around the valve stem. However, before you undertake to repair either one of these leaks you should understand the mechanism of the particular faucet. The two commonly used faucets are known as the compression faucet and the Fuller faucet. The Fuller faucet is somewhat more difficult to repair than the compression faucet because of the more complicated method of opening and closing the valve. Nevertheless, these have several parts in common, as may be seen by the following.



1. Compression faucet.



2. Fuller faucet.

As shown in the cross-section of a compression faucet in picture 1, this faucet consists of several simple parts: *M*, tee-handle; *N*, valve stem; *O*, packing nut; *P*, packing; *Q*, threads on valve stem; *R*, disk washer; *S*, valve seat; *T*, plain nozzle. Likewise, in the cross-section of a Fuller faucet shown in picture 2, the faucet consists of the following parts: *A*, lever handle; *B*, valve stem; *C*, packing nut; *D*, packing; *E*, eccentric; *F*, rubber ball washer; *G*, pipe threads; *H*, plain nozzle.

The actual procedure in repairing a leak in both faucets is practically the same. First determine where the faucet leaks. Then shut off the water with screwdriver and wrench, being careful to wrap all nickel parts with a cloth before using the wrench. Next remove valve stem. Now replace the rubber washers or gaskets, cotton packing, and the like, before you assemble the other parts. You are now ready to test your repair job. Turn on the water and operate the handle to ascertain if you have caused the leak to disappear. In case the handle does not operate easily you should slightly loosen the packing nut. Care should be taken not to mar or otherwise damage the finish of the faucet by the careless use of either your screwdriver or your wrench.

FUN IN A BOX OF MATCHES

A BOX of Swedish safety matches costs one or two cents. A good deal of amusement can be had with this little box, still leaving the matches perfect for their original purpose. The pictures that we see in this article can teach us some feats with safety matches.

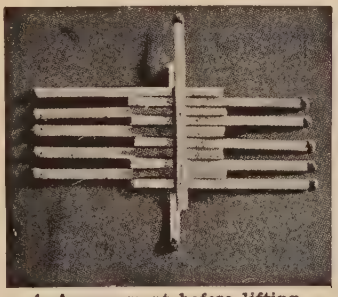
The first feat that we may try to perform is to lift three matches with one match. It sounds hard, but the pictures show that it is really simple. We first slit the end of one match a little way and trim the end of the second to a wedge-shaped point. We insert the wedge-shaped point into the slit, when the two will be the shape of an inverted V as seen in picture 1. Now we place a third match as seen in picture 2, so that the whole three remain standing like the corners of a hollow pyramid. By inserting a fourth match as seen in picture 3, and then by gently moving the first two matches so that the third match falls on to the lifting match in the manner shown, the whole can be lifted with a steady hand.

1. Joining two matches.

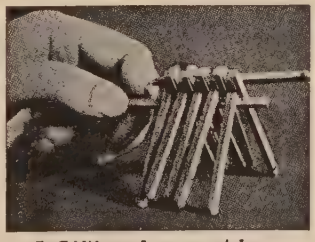
2. Three matches standing.

3. Lifting three matches with one match.

Now we may set ourselves the task of lifting several matches with one match. The number lifted may vary, but picture 5 shows eleven matches lifted by means of one match. This trick is performed more easily with square-shaped matches than it is with round matches, although with round matches it may be done also. The two rows of matches, as seen in picture 4, should be placed with heads outward and close together on top of the bottom match. The top match should be placed so as to leave room for the finger and thumb to grasp the bottom match without disturbing the arrangement. Then, by lifting as in picture 5, the feat may be accomplished. It is a good plan to have the under match project over a table edge.



4. Arrangement before lifting.



5. Lifting eleven matches.

Picture 6 shows twenty-four matches arranged so as to form nine squares, and the problem is to take away eight matches and leave two squares. The way to do this is shown in picture 7.

Now, there is a genuine trick that is a little mystifying if adeptly performed. We take a match in each hand, the hands resting palms upward on the table. Then we close the hands and ask someone to place a match upon the closed fists, as seen in picture 8. We now say that we are able to pass the match from one hand into the other without opening the hands. We make a rapid up-and-down movement of both hands. This causes the two visible matches to fall on the table, and we ask our friend to replace them on top of the knuckles. He does so, and we make another rapid movement so as to cause the two exposed matches to fall into the hands. Then we open the hands, one of which is found to contain three matches and the other to contain only one, as seen in picture 9. The secret of the trick is that when we let the two matches fall upon the table they were not the two from the top of the knuckles of each hand, but one from the knuckles and one from the palm of the same hand. The movement we made caused one knuckle match to fall into the palm of the hand, so that, unseen by the spectators, when the two matches were seemingly replaced, one palm held two matches and the other was quite empty. The next trick to which we shall give attention is called the tramps and ducks. We take seven matches, two of which we retain—one being left in each hand—and the other five we place on the table in front of us, as seen in picture 10. Then we tell the little tale of the tramps and the ducks. "There were two tramps—the matches in the hands—who saw five ducks—the matches on the table—and resolved to steal them. So they took one alternately." Here we pick up the first of the five matches with one hand, the second with the other hand, and so on, alternately, until there is none left on the table. We resume the tale: "But before they had run away they saw the farmer coming, and so they put down the ducks again." Here we replace the matches on the table, one from each hand, alternately, until all five have been put down. "The tramps hid in a hedge until the farmer had gone, and then they crept cautiously toward the five ducks and

took them up as before." Suiting the action to the words, we again pick up the matches one after another with alternate hands. Then, keeping the hands closed, we go on again: "But the tramps began to quarrel, and one said to the other,

6. Nine squares.

7. Two squares.

Picture 13 shows the last trick, which is performed not with matches, but with the matchbox. We place the two pieces of the matchbox in the position shown, intimate that it is our intention to bring our closed fist down with all

8. Conjuring with matches.

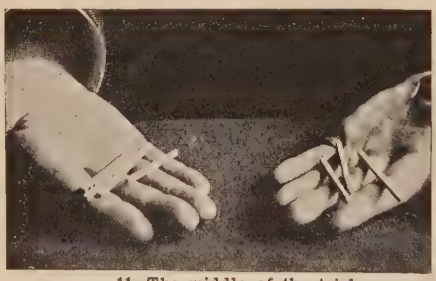
9. How is it done?

'You have got four ducks and I have only one.' And so he had." Here we open the hands, one of which has two matches in it and one has five, as seen in picture 12. The audience is naturally very much perplexed at the result.

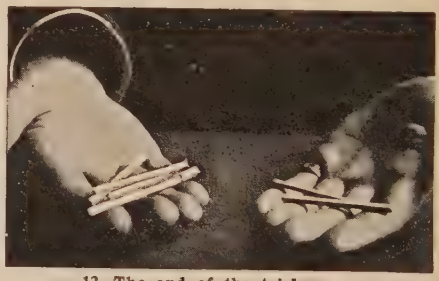
The secret of the trick is this. After we had picked up the five matches the first time, there were three matches in one hand and four in the other, as

10. The tramps and ducks.

our force upon the topmost point, and invite opinions as to which piece will be broken by the blow. We shall have some of our friends say that the upper part, being not so strong as the other, will break, while others will assert that the lower part, being underneath, will receive the full force of the stroke, and therefore break. But when we strike, no matter how hard, we



11. The middle of the trick.



12. The end of the trick.

seen in picture 11. When we replaced the matches on the table we began with the hand having three matches, so that when the five matches were on the table again one hand had two matches and the other none. Of course, we did not let this fact be noticed. Then, when we picked up the matches finally, we began with the hand that already held two matches, with the result that, as we have seen, we finished with two matches in one hand and five in the other, as shown in picture 12.

13. A trial of strength.

shall find that the two pieces bound away unbroken. The result is so unlooked-for and so unexpected that it generally causes much astonishment among the audience. This is only a little of the fun to be obtained from a box of matches. Other problems to be performed with matches are given on page 624, and the answers to them appear on page 896.

We should not attempt these tricks unless we use safety matches, and even then we should be very careful not to light them.

SOME GAMES FOR OUT OF DOORS

GARDEN QUOITS

GARDEN quoits should be played with wooden rings, or wire ones bound with some soft material. A peg is driven into the ground, and the players stand at a distance, each having a number of rings. They then throw in turn, and those who get the greatest number of rings over the peg win the game, and any prizes that may have been offered.

CUDGEL

TWO small holes 10 feet apart are scooped in the ground, and round each a circle about 1 foot wide is drawn. At these holes two batsmen stand, each armed with a short stick, one end of which is held in the hole. From a short distance away, two bowlers pitch, in turn, a small piece of wood called a cat toward the holes. If it drops into one of the holes both batsmen are out, but if it is struck by one of them they change places as quickly as possible while the bowlers try to drop the cat in a hole before either of the batsmen can protect it by popping in his stick. If the cat is pitched by a bowler so as to fall inside the circle surrounding a hole, he picks it up and runs to a little distance with his partner.

They then decide between themselves, without the batsmen knowing, which shall hold the cat, and then return to ask the batsmen to guess who holds the cat. As the question is asked they both kneel down, one opposite each hole, and the batsmen answer by simply standing together opposite the bowler they choose. If the guess is correct the game must go on as before; if wrong, the boy holding the cat at once pops it into the hole by which he is kneeling, and the batsmen become bowlers.

HOP, SKIP AND A JUMP

DRAW a line on the ground, and stand so that the toes just touch it. Then, lifting one foot, hop as far as possible. Follow this with a skip, and then, with both feet together, give a long jump, remaining quite still at the end of it till someone has drawn a line where the heels struck the ground. Each player in turn does his best, and the one who covers the greatest distance with his hop, skip and a jump is the winner.

OBSTACLE RACE

THIS is great fun and will show the different ways boys have of getting over difficulties. Instead of the race-course being kept open, obstacles are put up at different places for the runners to get over as best they can. Those who do so most quickly are likely to reach the winning-post first. For small boys these obstacles should not be too troublesome. The first might be a long hurdle for them to climb; the next a row of bottomless canvas sacks side by side on the grass, one for each boy to crawl through; and perhaps beyond these a number of ordinary school slates pegged to the ground with pencils attached, upon which each runner must write—quite distinctly—a short sentence arranged beforehand, adding his number instead of his name at the bottom of the slate. Other kinds of obstacles, however, will very soon suggest themselves to those who manage the race.

GUARD THE BLOCK

IN the middle of a large circle an old tin or small block of wood is placed, and the "keeper" stands over it to guard it. The rest of the players try to kick it out of the circle, and when one succeeds they all run away and hide. The keeper then replaces the block, and sets off in search; but he dare not go far in case one of the enemy should run from hiding and steal his block again. The moment he spies anyone he calls out his name and races back to the block to touch it before the boy he has found can get there. If he succeeds in doing this the other becomes his helper, and the first keeper may more safely go on with his search; but he should not go too far, lest several of the hiders come out and attack his new partner. In that case he would have to begin all over again. Every time anyone is found the keeper must touch the block, and when more than half the players have in this way become assistant keepers, the rest must return from hiding, and a new keeper is then chosen.

THE LEAPING-POLE

THE leaping-pole should be of strong wood, quite smooth, and not too heavy. The boy who uses it should not hold it too high up to begin with, and should not try to jump too far. He ought to make a short run and, taking a firm grip with both hands, putting the right a little above the head and the left about two feet lower down, plant the foot of the pole on the ground, and lift himself up as it swings over. The height and length of the jumps should be increased by degrees. There is no healthier exercise than that with the leaping-pole, if it is used as it should be.

THE JOLLY MILLER

THE miller stands in the centre of a circle formed by the rest of the players walking round and round in couples, arm in arm. They sing this song as they walk:

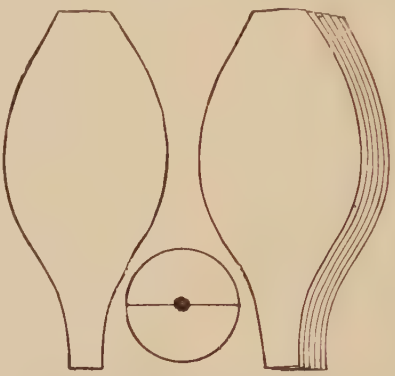
"There was a jolly miller and he lived by himself,
As the wheel went round he made his pelf.
One hand on the hopper, and one on the bag,
As the wheel went round he made his *grab*."

At the last word the couples change partners. Each outside player moves forward and takes the place of the inside player in front, who, at the same time, occupies the place left vacant by his partner. If the miller, however, can get a place first, the player who is left without a partner must take the place in the centre of the walking ring or wheel, and wait for the chance of "grabbing" someone else's place when the verse has been sung again.

MAKING A HOT-AIR BALLOON

ALMOST everyone has seen the big paper balloons that are sent up at fireworks displays. Generally they are made to carry colored lights, so that when the balloons fly away they can be seen until they rise to such a height that they look like tiny stars in the sky. These balloons are made of tissue-paper, and they are not filled with gas, but with hot air. It is quite easy to make one.

At any stationer's shop we can buy large sheets of tissue-paper. It is best to buy a quire, or twenty-four sheets, which will cost about ten cents; and, if possible, we should get two colors. Then we can make our balloon with colored stripes. When we have got the paper, we must lay it all out flat on a table. Then with a soft pencil we can draw on the top sheet the shape shown in picture 1, but as large as possible on the paper that we have. When we have marked the shape, we can fold the first sheet down the centre from top to bottom. This will show us if the two sides of the shape we have drawn are the same. If they are, we can cut round the pencil-lines with a pair of scissors. This first sheet will now form a pattern for all the others. We should lay it over them and cut very carefully through the remaining twenty-three sheets with the scissors, so as to make them all exactly the same size as the first one. We now have to stick them all together very firmly.

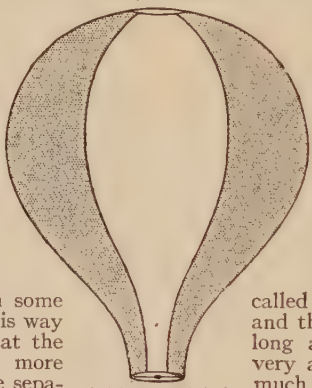


1. Pattern cut out. 2. Wire ring and wool. 3. Pile of sheets for gumming.

We first take a white piece and lay it flat. Then we place over it a red or blue piece so that on one side a little of the white shows. We put another white and another colored one over them in the same way, always leaving a little of the edge of each sheet showing. Picture 3 shows clearly how this must be done. We next brush some thick gum over the edges. In this way we can gum five or six pieces at the same time, and do it much more neatly than if we did each piece separately.

When the gum has been spread smoothly, we pick up the top sheet and carefully stick the edge to the ungummed side of the sheet below. The same thing is done with six sheets, using white and colored pieces alternately, and then joining the first and the last sheets. We shall now have a paper balloon complete except for a small hole in the top. To cover this we cut a circular piece from some of the paper we have left over, and then stick it carefully and very neatly over the hole. A patch of contrasting color is effective. When the gum has dried we must put the nose of a pair of bellows into the opening at the bottom and blow air in gently. In a few minutes our balloon will expand, and we can see if all the edges have stuck properly. If they have not, we must put on a little more gum, because, of course, the balloon must be air-tight.

We must now measure the opening at the bottom, and with a piece of thick wire make a ring that will just fit into it. We fix one piece of wire across the centre of the ring, as shown in picture 2, and in the middle of this straight piece put a little tuft of cotton batting. Now we very gently fix the ring into the opening, fold the edge of the paper over it, and gum the folded part down firmly. Our balloon is now quite finished, as we see it in picture 4. Taking it out into the garden, we choose a place sheltered from the wind, and then pour a little alcohol or oil on the cotton batting, being very careful not to let any of the fuel get on to the paper. When it is all ready we should get somebody to hold the balloon up for us while we put a match to the cotton batting. We must do this very, very carefully because everything depends upon this moment. If the little flame touches the tissue-paper it will of course burn a hole in it. In a few minutes the hot air will make the balloon expand till it is nicely rounded out. Holding it until it looks quite full, we then gently let it go. It will rise very quickly into the air, and will go to a tremendous height. We shall have plenty of paper left, and can make another at once. If we send the next one up at night, we can tie a small firework to it—one of those called Bengal lights will be best—and then we shall be able to see it as long as the light burns. If we are very ambitious, we can make a very much larger balloon by sticking sheets of paper together before we begin to cut out the shaped pieces. The whole secret of sending up the balloons is to choose a starting-place sheltered from the wind. Of course on a very windy day it is no use trying at all. A moderate breeze does not matter, because if the balloon is sheltered until it has risen a little way it is safe. It is well to have an older person near to help us.



4. The completed balloon.

There is no danger because the balloons are taken into the garden before the fuel is used. Even if the tissue-paper catches fire through our want of care, it can be crumpled up and put out in two seconds.

DELICIOUS COCONUT CANDY

COCONUT candy can be made with or without milk, but it is certainly nicer and smoother when made with it. To make a really nice sweetmeat we need ingredients in the following proportions: ½ pound of desiccated coconut—the word desiccated only means "dried," but it is the proper thing to ask for when buying it at the grocer's—1 pound of loaf sugar, 1 small teacupful of milk, and ½ teaspoonful of baking-powder.

First we put the sugar into a large enameled saucepan and pour the milk over it. Then we put the saucepan on the stove, and let the contents come to a boil, stirring all the time to prevent burning. We can tell when it boils by the fussy bubbling it makes. The milk is allowed to go on boiling for 5 minutes, while we are still very careful to stir rapidly. Then the baking-powder is stirred in. The contents of the saucepan must not be allowed to boil over. Next we take the saucepan off the fire and stir the coconut into it. A shallow tin is lined with a piece of white paper, and half the contents of the saucepan are poured into it. The paper should be greased with butter so that it will not adhere to the candy when it is cooled. A few drops of cochineal are then stirred into the remainder in the saucepan, to make it pink, and this is poured on to the coconut candy in the tin.

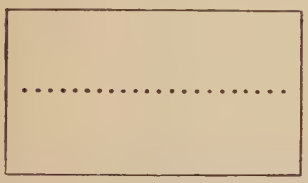
We must next press the surface of the coconut candy even with a knife, and set it aside to cool. When it is cold we take a sharp broad-bladed knife and cut it into bars as it lies in the tin.

Some people make coconut candy without the baking-powder, but the addition of a little certainly gives lightness to it and makes it more digestible and nicer to the taste. Such a candy is perfectly wholesome, and is not at all likely to make us ill after eating it.

HOW TO PASS THROUGH A POSTCARD

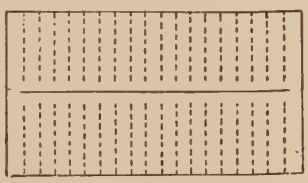
IT seems almost impossible to pass one's whole body through a plain postcard, and yet it is fairly simple to do so.

We must take an ordinary postcard, or, if we have not got one handy, any piece of card or paper the same size will do as well, and cut a slit across the middle to within ¼ inch of each side, as shown in picture 1.

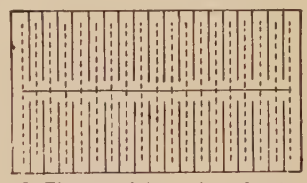


1. Where to make the first slit.

We must then very carefully make straight cuts, about ¼ inch apart, from the top and bottom edges of the card to within ¼ inch of the slit that we have already made down the middle, as in picture 2. We next make straight cuts from the original slit in the middle of the card to within ¼ inch of the top and bottom, taking care that these come exactly in the centre of the spaces between the cuts made from the outside edges. The final result of the cutting is illustrated in picture 3. If we now pull each end of the card we shall find that we have in our hands a long, endless, zigzag ribbon. We should fold the corners of the zigzag ribbon back carefully, and when this is done we have a huge paper hoop through which our body can easily pass. This is always an amusing trick.



2. The second series of cuts.



3. The complete series of cuts.

HOW TO REPAIR WINDOW SHADES

DO you have any window shades about the house which need to be repaired? In attaching, hanging and adjusting window shades, the shade should always roll smoothly and stop at the desired place. To repair any window shade, first attach the shade to the roller. This is done by removing all tacks from the shade roller and trimming the shade square on the roller end. Next fold over ½ inch of the roller end for reinforcement on the shade and tack the shade to the roller by using 1 ounce tacks and placing it on the blue line which will be found on the roller.

Now attach the roller to the window. Having the shade rolled up, measure the shade on the window so that it balances properly. While it is in this position place one of the hangers and make a mark for it. Then attach the hanger with tacks or screws. If screws are used you should be careful that each screw hole is large enough to admit the screw. Screw threads may be soaped to lessen danger of breaking the screw. By using the shade, place the other hanger in position and mark for it. The hangers should fit snugly or otherwise the shade will drop out. Now place shade in hangers. If the hangers fit too snugly just bend them out slightly and the shade will drop in place.

The spring tension is next adjusted. First release the spring by releasing the trigger. Care should be taken in order that your release may not break the spring. The shade is rolled up in the hands and replaced in the hangers and pulled down about halfway. If the shade is heavy you may pull the shade down about two-thirds of the window length. Then remove and roll it up. When it is replaced it should have the desired tension. If not, another attempt may be successful.

WHAT TO DO IN CASE OF FIRE

FIRE is all right in its proper place, but altogether to be dreaded where it can burn people or destroy property. So those persons who know what to do and have the presence of mind to do it are invaluable when clothes catch fire, the lamp upsets, the chimney or curtains are on fire, or the house is ablaze.

Little children are sometimes burned to death because they make a plaything of fire. They like to get hold of a box of matches and make a bright light by striking them; and then the dress may catch fire.

Suppose we have a little brother or sister, and one day when we are alone with him or her the clothes or hair catch fire. What ought we to do? In the first place, we must stop the child from rushing about the room or out into the passages and open air, which he will try to do, for that would make the clothes burn all the faster; we must seize a rug, a shawl, a coat, a counterpane, a blanket, a tablecloth, a jacket, or any big piece of woolen material, and wrap it tightly round him. That will stifle the flames, and they will go out for want of air. If a rug is near, we should roll the child on the floor in it, covering our hands as much as possible, or they will be burned too. If we cannot get a rug quickly, we should roll the child over and over on the floor. Anyhow, we must either press out or smother the flames, and if the window is open, shut it as soon as possible.

Lamps upset sometimes, or the paper shade falls on one side and catches fire. The burning oil flares up, and there is not a moment to lose. If possible, the hands should be wrapped in a handkerchief, cloth or leather, and we must then bravely take the lamp at arm's length and hurl it out of the window or into the grate, and sop up the oil. There is, perhaps, a tablecloth on the table where the lamp stands; the corners of it should be taken up, and the burning oil smothered with them. To pour water on the oil makes it blaze away more fiercely; but flour, sand or earth will put out fire. It sometimes happens that the window of a bedroom is left open and lace curtains are blown over a lighted gas-jet. In a moment the curtains are ablaze. Here is our best course of action now: We must first get on a chair and try to tear the burning curtains down, or, if we can do so, lift off the rods or poles. Then we must empty all the water at hand over them, or smother them with bedclothes. As soon as possible we should shut the window and door to prevent a through current of air in the room. A siphon of soda-water squirted at once is a good thing to extinguish a small blaze.

Chimneys catch fire, usually because they are blocked up with soot, or sparks set fire to a beam of wood near by. We must first put out the fire in the grate by pouring water or throwing flour, salt, sand or earth over it, and then hold a board, wet blanket, tablecloth, or piece of carpet before the fireplace to keep the fumes out of the room and to shut off a current of air from below. If the fire is very bad and likely to set the house on fire, the fire-engine must be called, and the firemen will probably get on the roof and block the top of the chimney to keep all air out.

Now we come to talk of a very dangerous state of things—a house on fire at night when people are in bed and asleep. Sensible folk talk over this and think what they would do if it ever happened. In a high building they usually have a long coil of rope or a rope-ladder ready to fix on to the balcony, leg of a bedstead, or a large piece of furniture, so that escape is possible by the window. Failing these precautions, sheets and blankets can be knotted together into reef knots at the corners, as described on page 342, and used as a rope to climb down, the mattress being first thrown out of the window to soften a possible fall.

Sometimes people wake in time to notice a smell of burning, and, of course, get up and find out the cause; but often the first they know of a fire at night is that they are being choked by smoke. They wake up in alarm; but before jumping wildly out of bed and running downstairs, they should stop to think a moment and find out the place of the fire and its state. Let us suppose that the fire is very fierce when we open the bedroom door. If other people are in the house, we must, of course, call to them. We can do that while wrapping a blanket around us, thrusting our feet into shoes and tying a wet towel or handkerchief around our head and mouth. Suppose the passage is full of blinding smoke. We should not try to walk upright, but creep on our hands and knees the nearest way to safety—upstairs, if the staircase is on fire below us; downstairs, if it is on fire above us. The air is freest from smoke close to the floor. Houses are now built so that tall ones must have a skylight or other exit to the roof.

If we are in a school or a public building which catches fire, there is not only danger of being burned, but risk of being crushed and trampled on when the crowd rushes wildly to get out through one or two doors. In schools fire-drills are often held, and the children march out exactly as their teachers tell them to do. Everyone gets out in the shortest time possible, and there is no blocking of the passages; but when panic occurs in a hall or big public room, and people hustle and press toward the door, it is wise to look out for another way of escape, for there usually is one—a back or side door, a window to be reached by piling chairs on one another.

We should then break the glass and shout. Someone outside will probably see us or hear our cries and bring a ladder. If we are in the middle of the panic-stricken crowd we are safest if we keep our head up, our arms doubled up in front of our chests, and our elbows to our sides. That gives us the best chance to breathe and resist pressure on the ribs.

If we see a burning building we should first ring the nearest fire alarm. When the firemen arrive we should remember that they want all the space possible to work in. Fire engines and fire hose take up a lot of room and have to be moved quickly. So the most helpful thing that we can do is to keep at a distance.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 3853.